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PHARMACEUTICAL JOURNAL

AND

TRANSACTIONS.

VOLUME IV.

1844-5.

EDITED BY

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THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. I.—JULY 1st, 1844.

THE PROGRESS OF PHARMACY IN GREAT BRITAIN.

THREE years having elapsed since the formation of the PHARMACEUTICAL SOCIETY, we propose to take a brief retrospect of what has been done. This will serve as a general answer to some of our Correspondents, who (if we may judge from their inquiries) appear to have forgotten the circumstances which induced the Chemists of this country to unite, and the purposes for which the union was effected.

In almost every civilized country, the education of Pharmaceutists, and the practice of Pharmacy, are regulated by stringent laws, and, as well as other matters relating to the public health, are under the control of the government. In Great Britain this has never been the case, and while the legislature has not overlooked the safety of the public in reference to medical practitioners, the compounders and vendors of medicine have been passed over and allowed to take their own course. As a natural consequence of this oversight, a great number of uneducated persons have encroached upon the province of the Chemists and Druggists, who have therefore been stigmatized as a body of men possessing no legal qualification, and comprising many individuals unworthy of confidence.

Much dissatisfaction at this state of affairs had existed in the profession, for some years prior to the period to which we have just alluded. Medical reformers had already investigated the subject before a Parliamentary Committee, and numerous facts had been brought forward, proving that the public sustained a serious injury from the absence of proper legislation in reference to Pharmacy. But the parties thus engaged were chiefly medical practitioners; and among other complaints against the Chemists, they urged, as a grievance to the profession, that medical advice

was given across the counter by persons who were not only uneducated in medical practice, but who had passed no examination even in Pharmacy, their own particular department.

Vigorous endeavours were therefore used to put an end to this custom, and also in other respects to place the Chemists under restraints and restrictions to which they were not disposed tamely to submit.

Many of the Chemists had for some time been sensible that a salutary law, with reference to their own body, was desirable, not only for their professional credit, but also for their protection against the encroachment of illiterate persons into their ranks; but no effort on their part was made, until the prospect of a serious innovation on their privileges and independence obliged them to unite in self-defence. Any opposition to the progress of education in the profession, and the protection of those who had proved themselves qualified, would have been impolitic, as well as unavailing. It was therefore thought advisable for the Chemists to lay the foundation of that system of education and examination for their own members, which, according to the custom of other nations, should have been done by the Government. It was proposed to effect the desired result by the formation of a society, which all those already established as Chemists and Druggists, were invited to join.

The demonstration thus made by a large proportion of the body in various parts of the kingdom, had a very decisive and striking effect at the time. The measures before Parliament which had provoked the opposition of the Chemists, were speedily abandoned. The struggle between the Apothecaries and the Chemists gradually subsided, and the new Society gained ground so fast, that a Charter of Incorporation was obtained within two years of its establishment. The arrangements for providing an efficient system of education and examination in Pharmacy, have produced a reaction in favour of the parties concerned, who had previously been looked upon as an uneducated and disunited class of men, unworthy to be ranked as a portion of the medical profession, but

who are now recognised by all parties as the legitimate representatives of the Pharmaceutical Department.

But the most important part of the work remains to be done, and the time is fast approaching at which the Society will be in a position to take another step. The foundation of the system being laid, it must be confirmed and ratified by Act of Parliament, before we can safely or consistently relax in our efforts. A voluntary society is at the mercy of the individual members who compose it; and however salutary may be its regulations—however calculated, if universally supported, to effect the object desired, its prosperity, and even its existence, may be said to be more or less in danger until it becomes the basis of a legal enactment.

The Society, like any other voluntary institution of the kind, must be supported by subscriptions, and the immediate cause of alarm which, in the first instance, favoured its growth, having in some degree passed away, the inducement to continue this support is not so obvious to those who take a superficial view of the subject, as it was three years ago.

The secession of some of the Members is therefore an event which might naturally be expected, and the deficiency can only be supplied by those who are admitted by examination. But the examinations, not being enforced by Act of Parliament, are dependent upon the degree of popularity the Society enjoys, and are resorted to only by those who are particularly desirous of admission. A candidate who is rejected on account of his incapacity or ignorance, may relinquish the idea of membership, and instead of being obliged to qualify himself, may commence business although quite incompetent. Thus, the Certificate of qualification, granted by the Board of Examiners, is at present merely an honorary distinction, not a licence to practise Pharmacy.

If the Society enjoyed the support of the whole trade, it would be a disgrace to evade the prescribed ordeal; and any person offering himself to the public as a Chemist, without having submitted to the test, would be a marked man. In this case the examination would be almost compulsory, its influence in raising the qualifica-

tions of the Members would be universal, and the fees received from Candidates on examination would be sufficient to maintain the institution without any further Annual Subscriptions from Members and Associates. In fact, if all the regular Chemists and Druggists in this country were united, and unanimously determined on enforcing such a system of education and examination as would ensure to the public a supply of well-qualified Pharmaceutists, and protect the interests of the men so qualified, no obstacle or opposition could withstand such a concentration of influence, and an Act of Parliament would be unnecessary. Such a body could easily drive from the field any ignorant persons who might attempt to encroach upon the province of its Members: the complaints which we now hear respecting the injury done to the trade by Grocers, Oilmen, and other persons uneducated in Pharmacy, would be at an end. Pharmacy would be in the hands of an educated class of men, and as a natural consequence, the *trade* would become an honourable *profession.*

To attain this result, the co-operation of all the regular Chemists in the country would be essential, and the only obstacle to its attainment which has ever existed, has been the difficulty of inducing all to co-operate. When the undertaking was at first proposed, it was considered by many persons to be chimerical and fruitless. It was said that there was in the trade no public spirit —no disposition to unite in any measures for the general benefit— that the jealousy prevailing between individuals would be an obstacle to any union among them; and it was a common remark that even if this were to be effected, "the Chemists would not pull together for six months."

Notwithstanding these forebodings, and the discouraging aspect of affairs, the attempt was made. Every effort was used to promote harmony and good feeling among the members of the trade, to discourage jealousy and disaffection, and to found a Society which, while it provided for the enforcement of efficient laws respecting the education and examination of future Members, afforded ample protection and immunity to those already in business.

If the undertaking had been attended with complete and absolute success, it would scarcely have been necessary to apply for an Act of Parliament: at all events, this acquisition, if thought desirable, would have been attended with little or no difficulty. If the project had been a failure, it would have been fruitless to expend any further labour upon it. But the result, while it has been sufficiently successful to afford every encouragement to persevere, has nevertheless afforded evidence that some legislative enactment is necessary.

A large proportion of the trade has come forward in support of the general interests; a system is organised which has been found by experience to work well; the body thus united has obtained an amount of influence never before enjoyed by the Chemists of this country, and this influence admits of being considerably increased and beneficially exerted.

But there are still many individuals who have not responded to the general invitation of their brethren to co-operate in this important work. There are some even among our own members who have not sufficient penetration to appreciate the benefit to be derived from the union of individuals for mutual protection and advantage, and who request the favour of an arithmetical balance-sheet, showing the percentage of profit which they may expect to obtain on the amount of subscription paid to the Association! Such information might, with equal propriety, be asked with reference to the Police Rate, the Paving and Lighting Rate, the Sewers' Rate, the charges for Insurance, and other claims of the Parishes or the Government, for social protection and accommodation, the precise value of which cannot be calculated in figures, although the comfort of the public, and the protection of property, are dependent upon the existence of such arrangements.

There may be a few individuals who are disaffected from interested motives, under the idea that, by going against the stream, they may push themselves into notoriety. Such persons will find their level sooner or later.

If any argument were necessary to show the importance of unity of purpose and concentration of influence in the attainment

of any public benefit, we need only refer to the progress of reform in the Medical profession. For upwards of ten years the whole profession has been agitated with the cry of Medical Reform. Year after year the subject is brought before Parliament. One bill after another is brought in and thrown out. The Government has undertaken to bring in a bill—for two years the profession has been anxiously awaiting its arrival, and it was fully expected that it would have been passed last session; but at the present time it is uncertain whether it will not be deferred for another year, and even if it were to make its appearance immediately, it is doubtful whether it could be passed before the termination of the session.

It is not to be supposed that this extreme difficulty in framing and passing a medical bill arises from any want of zeal in the legislature, or from extraneous opposition. The houses of Parliament would readily support any salutary measure which enjoyed the sanction and support of the profession. The public would offer no opposition to such a measure, being interested in its adoption.

But the profession is divided against itself. The measures brought forward by one party are opposed by another, and while all are interested in the establishment of regulations for the *advancement of professional education*, and the *protection of qualified practitioners*, which are the leading objects of medical legislation, the difference of opinion existing among the parties concerned, as to the details of arrangement, have hitherto been an insurmountable obstacle to the attainment of the desired result, and the whole profession has suffered for want of that unanimity which would have secured a complete and easy triumph.

The Chemists are not divided into several parties. Those who take an interest in the concerns of the body at large are working harmoniously together; and if they avoid the evils of internal dissension, and continue to advance steadily and unanimously, there is no reason to fear opposition either in Parliament or in any other quarter.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

APPOINTMENT OF OFFICERS,
BY THE COUNCIL ELECTED AT THE LATE ANNIVERSARY.

At a meeting of Council, held June the 5th, being the first meeting after the Anniversary, a communication from Mr. Payne was read, in which he stated that his health would not admit of his continuing to take an active part in the proceedings of the Society; and consequently he could not comply with the request of some Members of the Council to allow his name to be proposed for the office of President during the ensuing year.

This intimation was received by the Council with very great regret, and all who were present united in expressing their sense of the loss the Society sustained in the retirement of so valuable and indefatigable a member, but at the same time hoped that he would before long be restored to health, and be enabled again to take a share in the duties of the Council.

The following officers were then elected:—

PRESIDENT—Mr. John Savory.
VICE-PRESIDENT—Mr. Morson.
TREASURER—Mr. Pigeon.

PHARMACEUTICAL MEETING,
JUNE 12th, 1844.

MR. INCE IN THE CHAIR.

THE first paper was

ON THE PRESENCE OF IRON IN RIVER WATER.
BY M. EUGÈNE MARCHAND, OF FÉCAMP.

SPRING water, river water, and even rain water, play so important a part in the arts and in domestic economy, that too much pains cannot be taken to determine with exactness the principles which are held in solution, and which almost always communicate to the waters, properties which in some cases are useful, in others injurious. This is especially the case when these waters are used in the food of men or animals, and still more, when they are employed in certain arts, in dyeing for instance.

These reflections have been suggested by the result of the analysis I have made of the water of two rivers, the Valmont and the Gangaville, which empty themselves into the sea at

Fécamp. They both take their source at a distance of about twelve or thirteen kilometers (seven or eight miles) from the sea, and they are united at a distance of about two kilometers from their common mouth.

The following is the result of the analysis of one litre (1.7608 pints imperial) of each of these waters :—

	VALMONT.	GANGAVILLE.
Free Carbonic Acid } Organic Matter ... }	Indeterminate Quantities.	Indeterminate Quantities.
Chloride of Potassium.....grammes	0.00000	A trace
" Sodium ..... "	0.02596	0.02481
" Magnesium ..... "	0.00000	0.00235
" Calcium ..... "	A trace	0.00000
Nitrate of Lime ..... "	0.00319	0.00708
Sulphate of Lime..... "	0.00355	0.00206
" Potash ..... "	A trace	A trace
Carbonate of Magnesia ..... "	A trace	0.00000
" Lime ..... "	0.20290	0.19630
" Ammonia ..... "	0.00190	0.00414
Sesquioxide of Iron and Alumina "	0.00093	0.00105
Silica . ..... "	0.01079	0.01210
	0.24922	0.24989

Hitherto but few Chemists, that I am aware, have pointed out iron as one of the ingredients that may be detected in river water, yet all incline to the opinion that this metal exists in a great number, and probably in all those rivers which, like those of Valmont and Gangaville, spring from a chalky marl. In fact, this marl contains a combination of protoxide of iron, which is soluble in weak acids, even in carbonic acid. It is natural to suppose, therefore, that the waters, as they spring from such soils, should contain iron in solution, and the organic matters which they also contain, retards the rapid oxidation of the protoxide of iron by the contact of air, so that there is nothing extraordinary in the fact that iron may be found in solution in river water, even at a distance of more than fifteen kilometers from their sources.

It is desirable, therefore, in analyzing these waters, always to test for the presence of iron. I consider the best method of arriving at an accurate determination is to add an excess of ammonia, and a few centigrammes of sulphuret of sodium to two or three litres of the water to be examined. After remaining in contact for twenty-four hours, there will be found at the bottom of the vessel, a white powder ($CaO, CO_2 + FeS$), which should be separated from the supernatant liquor, and treated with weak hydrochloric acid, boiling and quite free from iron, at the same time adding two or three drops of pure nitric acid. A

liquor will thus be obtained, which, being but slightly acid and concentrated, will possess the property of being coloured red by the addition of sulphocyanide of potassium, and black by the tincture of galls, although the water submitted to examination should contain only half-a-millionth of its weight of oxide of iron, as is the case with the two specimens of water, the analysis of which is given above.

No discussion having arisen on the above paper, Mr. Squire took the opportunity of alluding to

PROFESSOR CLARKE'S METHOD OF ASCERTAINING THE COMPARATIVE HARDNESS OF WATERS,

And the patented method of rendering them soft, by the addition of lime water*. (The process is described in the specification, and in Professor Clark's pamphlet, which is reviewed in the *Pharmaceutical Journal*, vol. i., pp. 156 and 216). The use of the Soap test in determining the amount of calcareous matter contained in water, was, Mr. Squire considered, likely to be useful to Pharmaceutical Chemists, as in many preparations the presence of such foreign matter was known to be injurious. He also stated, that the supply-pipes of cisterns to boilers were frequently blocked up by the deposition of carbonate of lime, and the interior of the boilers coated with fur to a considerable thickness, which, by this process, would be obviated. Mr. Squire demonstrated the use of the above test (which consists of a solution of one ounce of curd soap in a gallon imperial of proof spirit) by examining two samples of water, one from Ascot Heath, the other from the Thames: it was found that the latter contained nearly five times as much lime as the former. A considerable quantity of lead having been absorbed by the water at Ascot Heath from the pipes in which it was conveyed, the sample had been brought to him from the spring for examination, and he had been surprised to find it a remarkably pure water.

Dr. A. T. Thomson considered it a curious fact that any spring water in the vicinity of London should contain less lime than river water, as it was usually the case that rivers were more free from calcareous matter than the springs from which they originated, on account of the liberation of carbonic acid, and consequent deposition of lime during their course. He thought the subject worthy of investigation, as it would be a great advantage if a supply of such pure water could be conveyed to the metropolis, instead of that which is now furnished. He also thought

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* Professor Clark states that his process diminishes the hardness of Thames water by three-fourths, making it only one quarter of its natural hardness.

it desirable that the water companies should try Professor Clark's process on the large scale.

Mr. Phillips, jun., considered that the absorption of lead by the water at Ascot Heath, was accounted for by the fact of its great purity, it being known that the presence of salts protects lead against the solvent action of water, a fact which had been proved by experiments in his father's laboratory, where portions of lead had been for seven years immersed in water so contaminated, and also in distilled water. In the former case no perceptible formation of carbonate of lead had taken place, while in the latter there was a copious precipitate.

Mr. Ince corroborated this statement, observing, that he had tried a similar experiment with the same result; he doubted whether it was any advantage to have a water absolutely pure for dietetical purposes, as he considered the small quantity of salts which it usually contained rather beneficial than otherwise.

Dr. Thomson attributed the effects mentioned, to the presence of carbonic acid absorbed from the air, as he had made the same experiments in closely corked bottles, with a different result.

Mr. Scanlan had observed that, in condensing distilled water in a leaden worm, a considerable quantity of the metal was absorbed, rendering the product quite useless.

Dr. Pereira thought it by no means desirable (unless for the benefit of the Medical Profession) to supply this very pure water to the metropolis, as the probable result would be the frequent occurrence of colica pictonum, arising from the lead which would be dissolved by the water in its passage through the leaden service pipes. For he believed that it was this water, which, by acquiring a plumbeous impregnation from the pipes through which it was transmitted, that had paralyzed the buck-hounds at the royal kennel at Ascot. In reference to Professor Clark's process, he thought the fact had been overlooked, that the addition of lime water would only remove the carbonate of lime which was held in solution by carbonic acid, while it would have no effect whatever on other salts of lime, as, for instance, the sulphate, which was the salt principally concerned in giving water that property commonly called *hardness*.

Dr. Pereira here adverted to the possible danger which might attend the use of too much lime in the endeavour to render water softer; and mentioned a fact which had been communicated to him by Dr. Christison, namely, that mortar dropped into a leaden cistern promoted the corrosion of the lead by the water. Now, the efficacy of the mortar depended, in Dr. Pereira's opinion, on the lime.

Mr. Mowbray attributed the action of water upon lead principally to the presence of ammonia derived from the atmosphere.

ON THE FORMATION OF SCIENTIFIC COMMITTEES FOR THE ADVANCEMENT OF PHARMACOLOGY.

BY JONATHAN PEREIRA, M.D., F.R.S.
Honorary Member of the Pharmaceutical Society, &c. &c.

I AM anxious to draw the attention of the Council of the PHARMACEUTICAL SOCIETY to the propriety of establishing, under the auspices of the Society, a Scientific Committee for the advancement of pharmacological knowledge.

Those who have made the Materia Medica an especial object of their study, are well aware how much ignorance still prevails with respect to the natural history and origin of a considerable number of the substances used in medicine. Many points remain to be settled, questions to be answered, and uncertainties to be resolved, with reference not only to exotic, but even to indigenous products; not merely to rare, but also to some of the commonest drugs; not simply to modern, but also to some of the oldest articles of the Materia Medica.

No country in the world possesses so many facilities for carrying on inquiries such as those to which I here allude, as Great Britain. Her numerous and important colonies in all parts of the world, and her extensive commercial relations, particularly fit her for taking the lead in investigations of this kind. Moreover, she is peculiarly interested in such inquiries. From her extensive possessions in different parts of the world, we draw a very large portion of the substances now used in medicine. By the establishment of a committee on Pharmacology, in the mother country, an opportunity would be obtained of bringing into notice the various medicinal substances produced in the different portions of this great empire. In this way substances now unknown to or little employed by us, might be brought into use, and in some instances, perhaps, the produce of our own colonies might be advantageously substituted for that of other countries. Furthermore, in those cases in which British products are inferior to those of other countries, this committee might be able to ascertain the causes of the inferiority, and suggest the means of removing them. In these and other ways, then, I apprehend that such a committee would prove useful in a commercial, as well as a scientific point of view. It might be made the means of declaring to the remotest part of our colonial possessions the wants of the mother-country, and conversely, of making known to England the capabilities of the different portions of the British empire.

The efforts of private individuals are totally inadequate to effect the objects here aimed at; but a committee, established under the auspices of some influential public body, might do much; and

as I believe the Pharmaceutical Society to be the most appropriate institution for undertaking such investigations, I have ventured to draw the attention of its Council to the propriety of taking the matter into their most serious consideration. There is, in fact, no other public body in this country to which such inquiries can with so much propriety be referred. Its members are dealers in drugs, and, therefore, are peculiarly interested in all that relates to these articles. Many of them are extensive merchants, possessing the means of promoting the objects of these inquiries, either by furnishing information they already possess, or by obtaining it through their extended commercial relations with individuals in other parts of the globe. Lastly, it appears from the Royal Charter of Incorporation, granted to the Society last year, that one of the purposes for which this Society was established, and for which Her Majesty granted the Charter, was that "of advancing Chemistry and Pharmacy." I conceive, therefore, it is the duty of the Society, in conformity with its Charter, to aid and assist inquiries such as those here contemplated.

I have suggested the establishment of a committee for carrying out these investigations, because it appears to me that this would be the most effectual way of achieving the objects which I have in view. It does not, however, appear to me to be desirable to limit the committee to members of this Society, but to include such other persons as may be both willing and able to promote the objects for the attainment of which the committee was established. I am anxious that the formation of the committee should be conceived on a broad and liberal basis, and not on exclusive principles.

It will be obvious that several committees, having for their common object the advancement of Chemistry and Pharmacy, might with great propriety be established: thus, one on Pharmaceutical Chemistry. But inasmuch as the inquiries would be directed in other channels, I leave to those more particularly occupied with chemical investigations the development of the suggestion here thrown out. My object now has reference principally to the natural history of the Materia Medica; and the committee which I am anxious to get formed, might, with great propriety, be denominated "*The Natural History Committee of the Pharmaceutical Society.*"

It would be the duty of this committee to prepare from time to time lists of queries, *agenda*, and *desiderata* for each part of the world from whence medicinal products have or may be obtained. These lists would be published in the *Pharmaceutical Journal*—forwarded to the respective countries by private hands, by foreign ministers, by public bodies, and by any other available

channels—distributed to travellers, who would thereby have their attention specially called to the wants of the Pharmacologist—and lastly, republished in newspapers or journals which circulate in those countries to which the particular lists of queries refer. The answers, when received, to be read before the Society, and to be published in its "*Transactions.*"

For ascertaining particular points, it might be desirable, in certain cases, to offer rewards—either of an honorary nature, to stimulate the ambition of naturalists and others, or as a recompense for outlays in attaining the objects in question.

It is conceived that merchants and drug-brokers would be peculiarly interested in these inquiries. New drugs are frequently brought to this country, and old ones from new localities, which are unsaleable, except, perhaps, at a ruinous sacrifice, for want of a proper scientific examination. Now, by furnishing the merchant and wholesale dealer with information of a useful kind, an encouragement would be held out to such persons to furnish the committee with all new articles which may, from time to time, be brought to this country, and a notice of which would speedily appear in the *Pharmaceutical Journal.*

I am fully aware that this committee cannot carry on its investigation without some pecuniary aid; but I conceive that a small portion of the income of the Society cannot be more appropriately expended than in prosecuting scientific researches of this kind;—researches which are clearly within the scope of those objects contemplated by the founders of the Society, and set forth in the Royal Charter of Incorporation;—researches from which, it is presumed, benefit, both theoretical and practical, scientific and commercial, will emanate. The Pharmaceutical Society will, it is to be hoped, both raise its scientific character, and extend the sphere of its public utility by these means. The inquiries which it will set on foot must contribute to prevent those discrepant statements and dispel those errors which now disgrace our national Pharmacopœias. We may also reasonably anticipate from its labours an accession to the list of our Materia Medica.

The Chairman thought the proposition of Dr. Pereira very judicious, and as a Member of Council pledged himself to introduce the subject at the next meeting. He felt persuaded that the plan would be adopted, and had no doubt it would produce a very beneficial effect.

Mr. Mowbray said, that the Medico-Botanical Society had lately discussed a similar course of proceeding, in which it was proposed, among other means, to obtain the assistance of our consuls in various quarters.

Dr. A. T. Thomson thought the propriety and advantage of the measure was undoubted, and its adoption would be of essential service to the Society. He thought the details of an undertaking of this kind would be easily arranged by such a committee as it was proposed to appoint, and that it came quite within the province of the PHARMACEUTICAL SOCIETY to undertake such a scheme.

Dr. Royle entirely concurred in all that had been stated in reference to the advantage which could not fail to result from the appointment of the proposed committee. He had very frequently, during his researches in Materia Medica, been surprised to find how much ignorance prevailed respecting the natural history of drugs among the dealers and importers from whom he had expected to derive information. There were many points which even the best-informed who had made Materia Medica their particular study, had been unable to clear up. The wholesale druggists had on many occasions, when applied to respecting any particular drug, referred him to the merchant or broker from whom they had obtained it. The merchant or broker again referred him to his correspondent abroad, naming the port from which it had been exported; but here the information ended. Articles were collected in various parts of distant countries, and habitually offered for sale at a market in some particular locality, and sold for exportation to parties who took no trouble in inquiring whence they came or how they were prepared. Hence, many of the statements published in this country respecting the source, history, and statistics of foreign drugs were founded on conjecture or erroneous data. For instance, myrrh had long been ascribed to Arabia, because it was an article of commerce among the Arabs, but it had recently been proved to be the produce of Africa. Frankincense, in like manner, had been stated to be a product of India, whereas it came from Africa. It was not only desirable to trace the origin of drugs, but also to investigate the natural history of the plants or animals affording them. In the case of some medicines, the comparative market value of the produce of different localities was regulated by prejudice. For instance, the East Indian senna, which comes to this country in a pure state, is worth much less in the market than the Alexandrian, which is systematically adulterated, although he believed the medicinal value of the former to be at least equal to that of the latter. Travellers were often unable to supply the deficiencies in our knowledge on such subjects, from not being aware on what points information was required, and the reports which they brought back were often so vague and imperfect, that they rather increased the evil by the propagation of error. This evil might be avoided, and the desired knowledge

obtained, by the proposed plan of furnishing travellers with lists of *desiderata*, with other needful instructions. Professor Royle proceeded to observe, that brokers frequently condemned drugs because they were unacquainted with them, and new remedies were sometimes imported from countries where they had obtained great celebrity, but their importation resulted in great loss, on account of the difficulty which prevailed in circulating any new product in the market. The existence of a committee of practical men to whom application might be made in such cases, would be essentially useful in a commercial, professional, and scientific point of view.

Mr. Squire entirely acquiesced in the sentiments of Professor Royle, and suggested that the offering of prizes, as proposed by Dr. Pereira, might be beneficially extended in reference to pharmaceutical preparations made in foreign countries. Thus, for instance, the extracts of plants which ought to be manipulated in the fresh state, might be made in the countries where the plants are abundant, and such instruction might be forwarded as to ensure the most satisfactory result. He had recently met with an instance in the Indian hemp, of which Dr. O'Shaughnessy had sent him a supply of the dry state to be made into extract, with a portion of extract made the same way in India. On comparing the effects of these, it was found that the extract made in India was three times as strong as that made in this country.

Mr. Mowbray observed, that in order to render the proposed measures efficacious, the co-operation of the medical profession was essential. It was, in fact, impossible for the Chemist to effect any good results, in reference to new remedies, without such aid. Any dealer who should presume to offer in the market an article not usually understood, was suspected of interested motives in recommending it; and it not unfrequently happened that large quantities of valuable remedies untried in this country, were imported on speculation, and destroyed, or allowed to spoil for want of a demand.

Mr. Bell admitted that it was in vain for the Chemist to import or prepare remedies of any description unless medical men would prescribe them; but he had never heard of any difficulty existing in this respect, the profession being always ready to try any substance from which a beneficial result was anticipated. As a Member of the Council, he might be allowed to express his persuasion that the suggestion of Dr. Pereira would be adopted, the only question admitting of an argument having reference to the expense attending it; but he conceived that the Society having been founded and chartered as an institution for the advancement of Pharmacy, the Council would be justified in carry-

ing out this leading object of its formation in any way that might appear most desirable.

Mr. Johnson, having just returned from a distant part of Africa, could corroborate much that had been said as to the difficulty experienced by travellers in obtaining the knowledge most in demand of the products derived from the countries though which they passed. This difficulty would be in a great measure removed by the publication of the requisite instructions for travellers. He had recently been enabled to identify the tree yielding gum myrrh, and had thus established the fact that it was a product of Africa, although not known by that name or used as a medicine by the natives. Its principal use there was as an ingredient in ink, being mixed with lamp-black and other substances, to which it was added for the purpose of preserving the parchment or paper. He had found two kinds of myrrh, one of which was entirely, and the other only partially, soluble in water. The former was preferred by the natives. He believed both kinds were imported into this country, but sold indiscriminately. Lists of *desiderata* were published for the use of travellers by the Entomological Society, and he thought the plan very desirable as a means of promoting the study of Materia Medica and Pharmacy.

Dr. Pereira thought it right to make a few remarks on the reasons which had induced him to advocate the plan which he had laid before the Society. Many young men, on going abroad, had applied to him for instructions and lists of subjects requiring investigation, and he knew that a desire to promote science in this way often existed without the knowledge of the best means of attaining the result. In fact, it frequently happened that travellers did not know the points which were required to be investigated in the countries visited. Previous to the departure of the Antarctic expedition, under the command of Captain (now Sir James) Ross, instructions were drawn up, at the request of the Government by the Royal Society, for the use of the expedition, pointing out the various subjects of inquiry in the different departments of science, and the best modes of conducting the investigations. A few years since, the Royal Asiatic Society formed a committee to effect that for the commerce and agriculture of India which he (Dr. Pereira) was anxious to do for pharmacology.

Dr. Pereira then proceeded to state that he did not wish to confine the inquiries of the proposed Committee to exotic products. Much still remained to be done with respect to drugs produced in our own country. For instance, two sorts of *Hén-bane*, the annual and biennial, had for some time been supplied to the markets, but the fact had not been generally known until

recently, and it was still a matter of dispute whether they were *distinct species* or merely *varieties*. De Candolle has described twenty-nine varieties of *Aconitum Napellus*. Now it was desirable to know which of these was cultivated and used for medicinal purposes, and which was the most potent. Moreover, the proposed Committee might, in some cases, point out improved localities for cultivating medicinal plants. *Œnanthe crocata* had long been considered a powerful poison: but Dr. Christison had lately met with this plant in Scotland, which appeared quite inert; whereas at Greenwich, Woolwich, and other places, the plant was found to be highly poisonous. It was desirable to ascertain the cause of this difference, whether it arose from *peculiarity* of soil, or other causes.

Dr. Pereira then proceeded to show in what way merchants might assist naturalists in their inquiries into the origin of drugs, and mentioned, by way of illustration, that he had been thus enabled to find out that *kino* was produced in the neighbourhood of Tellicherry.

Dr. Royle observed that he had traced the locality where kino was produced, by a totally different mode of inquiry, and could confirm the accuracy of Dr. Pereira's information. He had found that it was obtained at a farm within a few miles of Tellicherry, but the proprietor had refused to furnish any information with respect to the plant which yielded it.

Mr. Squire inquired whether the Œnanthe crocata, which was innocuous, grew near the sea, as the circumstance mentioned by Dr. Pereira reminded him of an experiment performed by Dr. Stevens, who injected a solution of morphia into the jugular vein of a horse, which produced instant death. Into the jugular vein of another horse a solution of common salt was previously injected, and the morphia in that case produced no effect. He thought it probable that the action of saline substances might in such cases modify the effect of the poison.

RECOGNITION OF DR. A. T. THOMSON'S LECTURES ON BOTANY, BY THE APOTHECARIES' COMPANY.

"*Apothecaries' Hall*, 31*st May*, 1844.

"Sir—I am directed by the Court of Examiners of this Society to inform you, that they have placed your name on their list of Recognised Teachers of Botany, and that Certificates of Attendance upon your Lectures on that subject will be received by the Court. I am, Sir,

"Your obedient Servant,

"Henry Blatch,

"*Secretary.*"

"*To Dr. Anthony Todd Thomson.*

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MODE OF PRESERVING COLCHICUM CORMI.

By Joseph Houlton, M.D., addressed to the Editor.

In the last July number of your valuable Journal you honoured me by a notice of a paper of mine on the Drying of Roots, &c., which had been read before the Royal Medico-Botanical Society, I therefore take the liberty to offer some further remarks on the subject—remarks which have been stated to the above-named Society, but I am not aware that they have been made public. It always affords me much pleasure to contribute the humble results of my observation and experience towards the advancement of a department of science that has been till lately too much neglected: I am happy to see a spirit rising amongst the Pharmaceutical Chemists of our country for the improvement of Pharmacy. England bids fair to be soon foremost in the field of this department, from the talent and industry that is now engaged in the work. It is curious to contemplate the position that pharmaceutical power is likely to hold in a few years' time, and also its influence, not only on science, but on institutions.

The observations which I beg to place before you are upon the method in which the cormi of colchicum should be managed, so as to ensure their drying spontaneously without being sliced. It is simply this: they are to be stripped of their loose dry coats, and the bud or little bulb, the rudiments of the future plant, is to be carefully picked out—it is a very small part, but easily seen; this part has a high vital endowment, and is very tenacious of life, and unless removed the cormi will not readily become dry; yet when that is removed to any dry place, they will become exsiccated without any trouble, and that in a short time. To show the difference that this circumstance makes, let a few be placed in their entire state near those that have been mutilated, and the difference in a week or two will be very manifest, the entire cormi will appear quite fresh. The plan I adopt is more safe and economical than that usually followed, as the cormi are not exposed to a high temperature, nor are their juices under the direct influence of the atmosphere, both of which circumstances are injurious to the more delicate medicinal vegetable articles.

I have chosen this season of the year to make this communication, because the time is near when the cormi colchici will be ripe: they should be dried before the bud has sprouted, August is a very proper time for preparing them. I hope some at least of the Pharmaceutical Chemists will try the method, if it be but on a small scale, I cannot at present recommend it to be generally adopted, as it is contrary to the explicit orders of the college, and those who have the temerity to break the laws therein laid

down, know very well that "*they will not only incur Her Majesty's displeasure, but be proceeded against for such their contempt and offence according to the utmost severity of the law.*"

But practitioners may follow the laws of nature and the dictates of their conscience in reference to Pharmacy, without the fear of penal statutes, and I hope there are many who do, and that they will aid in carrying out improvements in Materia Medica, Pharmacy, and Therapeutics.

ON THE DECOMPOSITION OF THE IODIDE OF IRON AND ITS SYRUP.

BY RICHARD PHILLIPS, JUN.

The iodide of iron, as is well known, undergoes decomposition immediately after preparation, and even during it, although every care be taken in its manufacture. It has, however, been found, and I believe it was first proposed by Mr. Squire, in the *Philosophical Magazine*, that if a coil of iron wire be placed in a solution of it, although sesquioxide of iron is precipitated, no decomposition by which iodine is set free takes place; whilst if the iron wire be not present, both of these decompositions take place.

The usual manner, I believe, of accounting for both these decompositions is, that the iodide of iron becomes decomposed by the action of the atmosphere, the iron gaining oxygen from it, and consequently the iodine being set free, and then the iodine liberated reacts upon the iron wine. Nothing can appear clearer than this statement, although, as I hope to show, it is not borne out by experiment; and I must preface my observations by stating, that iodide of iron, as prepared according to the Pharmacopœia, is hydrated, containing one atom of iodide of iron and five atoms of water; and that in this form it most readily attracts moisture from the atmosphere. If a solution of iodide of iron, even recently prepared, be examined, it will be found to be acid to litmus paper, although, at the same time, but little sesquioxide of iron be precipitated or iodine set free; after, however, exposure to the air, as the solution becomes more acid, they become apparent. Now, according to the present theory, no acid could be formed; and there being only iodine, iron, and water present, this acid must be either hydriodic or iodic, the former resulting from the decomposition of the water (its hydrogen uniting with the iodine), and the latter from the absorption of the oxygen of the air. By Mr. Scanlan's test of starch and tartaric acid, I found it to be hydriodic, as on the merest trace of iodic acid being added, a black precipitate was formed. This test is strengthened by the fact, that if it were iodic acid, no iodine would be liberated. This view also appears to me to account more easily for the action of the iron wire, as I have found by experiment that

if a weak cold solution of iodine be allowed to act upon it, hardly any decomposition takes place. I therefore believe that when iodide of iron is decomposed, it first results from the decomposition of the water present, its hydrogen acting, as already stated, to form hydriodic acid, and its oxygen combining with the iron to form protoxide of iron, which latter, gaining oxygen from the air, becomes peroxide. The liberation of the iodine is easily accounted for by the well-known decomposition of hydriodic acid when exposed to the action of air and light.

The April number of this journal contains a paper by the Messrs. Smith "On the Syrup of the Iodide of Iron," in which they throw out some speculations regarding its decomposition, considering it probable that the iron becomes peroxidized, and that it is held in solution through the formation of some vegetable acid, such as acetic, formic, or oxalic. In the May number of the *Chemist*, there is also a paper by Mr. William Onion on this subject, in which he states his opinion that part of the iron becomes peroxidized, and forms a saccharate of iron by uniting with the sugar, and that the remainder of the iron is converted into a sesqui-iodide, part of the iodine being set free. From my experiments, however, I am led to the conclusion that the same decomposition occurs in the syrup as in the iodide, and I think the changes which take place in it after its formation, are fully accounted for by this view.

Sugar and some other substances, such as gum, exercise a well known remarkable power in the prevention of the further decomposition of bodies: this fact is well illustrated by the saccharated protocarbonate of iron, in which the sugar, preventing any alteration of the state in which the iron exists, keeps it as protocarbonate. It is also a fact well worthy of attention, that if a solution of a per- or protochloride of iron be mixed with syrup, when liquid ammonia is added to it no precipitation takes place. I have, however, found, in the case of the saccharated protocarbonate of iron, that after long exposure to the air, the surfaces exposed, become peroxidized.

The syrup, in the same manner as the iodide, becomes, even when not exposed to the action of the air, slightly acid, assuming at the same time a greenish appearance; on exposure it becomes of a brownish colour, its quantity of acid being increased, and, according to Mr. Onion, after having been kept for some months exposed, a black deposit takes place.

Now, if we suppose that, on account of the action of the syrup, the iodide of iron is but slowly decomposed into hydriodic acid and protoxide of iron, and that, on the same account, both of these are prevented, at least to a certain extent, from further decomposition, the syrup holding the latter in solution, the acidity and

greenish colour of the syrup first observed are, I think, accounted for. In process of time, however, by exposure to the air, the hydriodic acid becomes decomposed, yielding iodine, and the protoxide of iron is converted into sesquioxide; the latter, still being held in solution by the syrup: and in these latter conclusions I am fully borne out, both by my own experiments and those of the gentlemen I have mentioned. Mr. Onion found that when the syrup became of a dark colour, iodine was set free, and that a persalt of iron was formed, although, I should conclude from his experiments and my own, to no great extent. They agree that the dark colour of the syrup, after exposure, is owing to the formation of a persalt of iron. Now, although this might in some degree contribute to it, still I should consider that it is principally due to the liberated iodine which is held in solution, part of which would, without doubt, as Mr. Onion found, be precipitated after long exposure.

Craig's Court, June 21st, 1844.

FORMULA FOR A MERCURIAL PILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Should you think the enclosed process and formula for pil. hydrargyri worthy of insertion in your Journal, as communicated to me by Mr. Wrightson, of Hull, you will oblige, as the article is not in any way a misnomer when made according to the directions, being literally speaking, a "true blue pill." Though we are not justified in departing from the form laid down in the Pharmacopœia, still if an article superior should present by other means, without deviating from the general strength, there can be nothing wrong in trying the merits of such article. The process has been known some years, but I believe not published in your Journal.

Pil. hydrargyri.—Stearine (London mould candles separated from the wick) ʒj, rub it until it assumes the appearance of cold cream, then add hydrargyri ʒiv, and in ten minutes it will be effectually reduced; to these add conf. rosæ ʒiij, fine flour ʒiij, powder of gum arabic ʒj, otto of rose gt. j. These will form a superior pill in every respect. The liquorice powder ordered in the Pharmacopœia is of no medicinal value, and seldom genuine, whereas the flour and gum Arabic give a farinaceous and glutinous consistence to the mass, which you cannot obtain with the liquorice; this is the exact strength of the London Pharmacopœia. The other preparations of mercury can be made in the same manner with the stearine.

Your obedient servant,

R. M. M., A.P.S.

Bourn, June 11, 1844.

[The practice of using tallow or stearine in making blue pill was brought before a meeting of the PHARMACEUTICAL SOCIETY, December 13, 1843, and condemned by the Members as a deviation from the Pharmacopœia. We publish the above, as a distinct preparation in some respects worthy of notice, and also because in case it should at any time be sold for pilula hydrargyri, P.L., our readers will be better able to detect the substitution by knowing the constituents.—ED.]

REMARKS ON A CRITICISM

CONTAINED IN BUCHNER'S REPERTORIUM, OF A PAPER ON THE PRESENCE OF PRUSSIC ACID IN SPIRITUS ÆTHERIS NITRICI.

BY MR. WILLIAM BASTICK.

IT appears that a correspondent of the above German journal of Pharmacy—evidently labouring under an attack of *cacoëthes scribendi*, and feeling annoyed that prussic acid should have been found in the spirit of nitrous æther or nitrous æther (it being immaterial which, although the poor critic does not think so) prepared according to a process used and invented in his country—has attempted a criticism upon my paper published in the *Pharmaceutical Journal* on that subject. He insinuates that the precipitate obtained by the silver salt might have been chloride and not cyanide of silver. Now, if the critic had only, wilfully or unwilfully, not forgotten that I stated I had used the silver salt merely as a means of determining the *quantity* of prussic acid in the nitrous æther, having *previously* ascertained its presence "by the most unequivocal tests," he would have rendered this reply unnecessary. I will further add, for the benefit of the doubting critic, that the substances employed in the preparation of the nitrous æther were chemically pure, and that one of the unequivocal tests used was that of Scheele, namely, the proto-peroxide of iron, which gave, when applied in the usual manner, a precipitate of Prussian blue.

Since my experiments were made on this subject, Mons. Dalpiaz has instituted a similar investigation, and has corroborated my results in every particular; and a committee of the Pharmaceutical School of Paris (appointed for that purpose) has made a report on M. Dalpiaz's observations, declaring their perfect concurrence in his statements.

Brook Street, June 2d, 1844.

THE EXPOSITION OF THE PRODUCTS OF FRENCH INDUSTRY.

THIS exposition which was first organized by Napoleon, and now takes place every five years, is not only an object of great interest to the inhabitants of Paris, but attracts from all the French provinces, and also from foreign countries, a very large

number of visitors. This vast bazaar is held in a temporary building erected for the purpose in the Champs Elysées, contains several thousand stalls, and every article that can be imagined, from a steam engine to a blacking bottle, may be found within its walls. Chemical and pharmaceutical products and apparatus forming part of this Exposition, we have thought it within our province to notice it; in fact, the chemical arts form in many respects an interesting feature, as connected with dyeing, electro-plating, sugar manufactures, &c., and the exposed specimens of cut glass, show great improvement in this branch of the chemical art, and show them to be no mean rivals of the justly celebrated Bohemian manufacturers.

The French have long been celebrated for their taste in bijouterie and orfevrerie, and have not failed to employ the process of Elkington in aid of their art; their artificial gems are also without rivals.

The student in natural history and anatomy would probably derive much pleasure and information from some exquisite models in composition, most accurately formed, and beautifully executed, they are the work of Dr. Auzoux.

It is well known that our continental friends are accustomed to the use of lavements, and their love of this mode of taking physic is strongly displayed in the number and variety of their enema apparatus; every form of instrument that ingenuity can devise, is applied for this purpose, some are so handsomely constructed as to be recommended as chimney ornaments; in fact, they are as varied and numerous as their coffee-pots and lamps, and to judge from appearances in as general use.

Amongst chemical and pharmaceutical products, are some few of interest and beauty: opium products, amongst which are some fine crystallized codia, from the laboratory of M. Berthemot; cantharidine and crystallized oxide of antimony from Messrs. Boyveau; and a variety of pharmaceutical extracts prepared *in vacuo*, by Messrs. Menier, who are also celebrated as drug-grinders, a new branch of industry in France.

Although the French have banished patent medicines from legal sale, it must not be imagined they have been equally successful in getting rid of quackery, as we see even in this public exhibition, soap and water exhibited under the name of *saponine;* and sulphuric ether as *essence of saponine:* and these articles sold by an accredited Pharmacien. So also have they sulphate of soda, in small crystals, under the name of Epsom salts; and a few like speculations. Yet it is right to state, that the Society of Pharmacy gives no encouragement to such frauds; but on the contrary, speak loudly against them, and even object to the purchase of powders and extracts, holding it to be the duty of all dispensers to prepare their own, and thus render themselves solely responsible for their purity.

ON THE CHLORIDE OF GOLD.

Much difficulty has hitherto been experienced in obtaining the red and yellow salts of gold, so as to be perfectly soluble in water, and without reduction. After numerous experiments, I have succeeded in preparing these salts in a manner which appears to me to be unexceptionable.

M. Levol has published in the *Journal de Pharmacie* a good process for obtaining pure gold, by means of protochloride of antimony : that which I have used in my experiments has been obtained by this method :—

First, To prepare the yellow salt of gold, *aqua regia*, formed of three parts of hydrochloric acid, one part of nitric acid, and one part of distilled water, should be used. Put one part of pure gold into a porcelain capsule, and pour over it *aqua regia*, prepared as above ; the quantity of acid being double that of the gold employed. Cover the capsule with a plate of glass, and place it on a water-bath, made with a saturated solution of salt ; continue the application of heat, taking care to keep the capsule always covered, until the evolution of nitrous vapours has ceased. If the whole of the gold is not dissolved, add a little more *aqua regia*, cover the capsule again as before, and continue the application of heat until the vapours no longer appear. The plate of glass should now be raised and kept up by a piece of folded blotting-paper, and evaporation continued over the water-bath, until, on introducing a glass-rod into the capsule, and withdrawing it, the chloride of gold, which adheres, on cooling, becomes solid. Remove now the capsule from the water-bath, and the chloride will soon crystallize in small prismatic needles, of a fine yellow colour, approaching to orange.

The chloride obtained in this manner is entirely soluble in water, and without reduction. It is employed with much success in fixing the Daguerreotype images, and for many other purposes.

The red chloride of gold (terchloride) is prepared in the same manner, only the *aqua regia* employed is made with two parts of hydrochloric acid, and one part of nitric acid. The gold is first treated with excess of *aqua regia*, on a sand-bath, and the water-bath is not employed until the metal is entirely dissolved. In other respects the operation is conducted in the same way as in the preparation of the yellow chloride.—*Journal de Pharmacie.*

ON THE PREPARATION OF PERCHLORIDE OF IRON.

The sesquichloride or perchloride of iron exists in the anhydrous state and in the state of hydrate.

There are two processes for obtaining the anhydrous salt. The first consists in putting iron filings into a luted glass or porcelain tube, placed in a furnace, the tube being sufficiently long to project some distance beyond the furnace, and the iron being kept in that part of the tube directly exposed to the heat. When the apparatus has been thus arranged, the tube is heated to a temperature below that of red heat, about 752° Fahr., and then a current of dry chlorine is made to enter at one end of the tube. The chlorine is rapidly absorbed, the iron becoming incandescent, while copious vapours of sesquichloride are formed, which condense in the form of scales, having a violet colour and metallic lustre in the cool part of the tube.

The second process consists in saturating commercial hydrochloric acid with hydrated peroxide of iron either in the dry or moist state. The solution is commenced without heat, it is afterwards continued with the aid of a gentle heat ; when the acid ceases to dissolve any more oxide, the liquor is filtered and evaporated to dryness in a porcelain capsule, taking care to moderate the heat and to stir constantly. The product of this

operation is introduced into an earthen retort, and heated gradually, taking care not to apply any fire to the dome of the retort. Aqueous vapours are first disengaged, when these cease to appear, a cork is loosely fitted to the mouth of the retort, and the heat is then increased until the bottom of the retort becomes nearly red hot towards the close of the operation. The anhydrous perchloride sublimes on to the dome and into the neck of the retort, which is to be broken when cold, and the salt immediately enclosed in bottles.

Although the second of these two processes is the better and more easy of execution, yet many Pharmaceutists would find a difficulty in preparing it; moreover, the Codex orders as the medicinal perchloride of iron that which is prepared by the moist way.

Several processes have been proposed for making the hydrated perchloride of iron, which I will describe.

The Codex orders the red oxide of iron to be dissolved in hydrochloric acid, and the solution evaporated to dryness in a water-bath. This process is a bad one, because, however carefully it may be evaporated, the product always contains a large proportion of insoluble oxychloride.

MM. Thénard, Berzelius, and Orfila recommend in their works to prepare it by dissolving sesquioxide of iron in hydrochloric acid, evaporating the solution to the consistence of syrup, and allowing it to cool. The perchloride is deposited in fine red crystals, which are very deliquescent.

M. Béral has proposed to prepare it by dissolving precipitated sesquioxide of iron in hydrochloric acid, first without heat, and then with the heat of a water-bath, the solution is transferred to a porcelain capsule, and evaporated at a gentle heat to the consistence of syrup. When it has arrived at this point, the capsule containing the perchloride of iron is placed by the side of another capsule, containing caustic potash or lime, and the whole covered by a bell-glass. The alkali absorbs the water and hydrochloric acid, so that in ten or fifteen days, the chloride becomes a dry imperfectly crystallized mass. To keep the salt dry, it should be at once put into a bottle, before it becomes affected by the external air. This method answers very well, but it has the disadvantages of requiring a good deal of time, and affording a chloride which is not always uniform in composition, as it contains variable proportions of water, owing to the method adopted in its preparation.

M. Mohr has recently proposed to prepare the perchloride of iron by dissolving hæmatite by digestion in commercial hydrochloric acid, and boiling the mixture towards the end of the operation. The liquor is allowed to become clear, is then evaporated to the consistence of a syrup, and afterwards exposed in a covered vessel, in a cold place, such as a cellar, where after a few days it begins to crystallize, and continues to do so for several weeks. The mother-water is decanted, and the crystals preserved.

M. Mohr analysed the chloride prepared in this way, and found it to contain twelve atoms of water. He has therefore assigned to it the formula $Fe_2 Cl_3 + 12 H O$.

M. Fristche, who undertook a fresh investigation to determine the proportion of water contained in Mohr's chloride, found that the analysis of this chloride (and the same is also true of those prepared according to the processes of Orfila, Thénard, and Berzelius) affords very variable results with reference to the proportion of water, so that it is impossible to say whether it contains 10, 11, or 12 atoms of water. With 10 atoms it should contain 35.92 per cent., with 11 38.15, and with 12 40.22.

According to the same Chemist, if the preceding chloride be left under a bell-glass with sulphuric acid, the crystals are again reduced to the state of a thick liquid from which fresh crystals are formed, containing from 21 to 23 per cent. of water. If they contained 5 atoms of water, there would be 21.9 per cent. These same crystals may be also obtained, according to

M. Fristche, by fusing the chloride with 10, 11, or 12 atoms of water, evaporating so that a drop will solidify on cooling, and adding a few drops of concentrated hydrochloric acid before putting it to cool.

M. Fristche has been led by his researches to admit the existence of two hydrates of perchloride of iron perfectly crystallizable, between which there is no crystallizable combination.

As will be seen, many processes have been given for the preparation of hydrated perchloride of iron, but none of these are adapted for obtaining it readily, of uniform composition, entirely soluble, and susceptible of long preservation. The principal cause of the easy alteration which the chloride of iron undergoes when prepared by either of the processes described above, seems to be the large quantity of water which it retains. Thus, that of M. Béral, which contains the least, affords, soon after its preparation, a perceptible deposit of oxychloride, when dissolved in water.

Induced by M. Soubeiran to seek a practical process for obtaining, in a short time, a perfectly soluble perchloride of iron, of a sufficiently uniform composition to admit of its strength being easily estimated, I believe I have succeeded by submitting a solution of sesquioxide of iron in hydrochloric acid to evaporation under the two following conditions : first, evaporation at a temperature not exceeding 212° Fahr. ; secondly, evaporation in perfectly dry air,

After several experiments, the following is the process at which I have stopped :—Take of hæmatite, that which mineralogists denominate concrete red oxide of iron (*fer oxydé rouge concrétionné*), reduced to powder by pounding and triturating in small quantities at a time in an iron mortar, introduce this into a stoppered bottle, and add to it pure concentrated hydrochloric acid in such quantity that there shall be an excess of hæmatite, then agitate the mixture. The two bodies soon react upon each other, producing water and perchloride of iron, accompanied with the disengagement of heat. This first action having subsided, place the bottle near the fire, and shake it from time to time. After remaining in contact for several hours, allow it to deposit, and then filter the solution. The filtered liquor is received in a porcelain capsule, which is placed either on sand heated by steam, or over the mouth of a cucurbit, taking care to interpose a piece of flannel between the capsule and the cucurbit, which should be tied on to keep it in its place. The apparatus should be so arranged that the vapour may be all condensed by means of a proper refrigerator, as it is essential to the success of the process that no steam should circulate around the capsule, for if the liquor be evaporated in air charged with moisture, it undergoes decomposition at a certain point of concentration, hydrochloric acid being disengaged, and sesquioxide of iron precipitated. It should be stirred with a glass spatula during the whole time of evaporation, which must be continued until the liquid no longer disengages any sensible vapours of hydrochloric acid, and a drop solidifies on cooling. When it has arrived at this point, the chloride is poured into perfectly dry bottles, furnished with good corks, but as the salt on cooling becomes very hard, it is difficult to get it out of the bottles, to obviate which inconvenience, M. Soubeiran, who repeated the process, very judiciously recommended to pour it into a plate which has been slightly greased, and immediately to cover it with another plate, and lute the two together. After about twenty-four hours, the plates are to be separated, the chloride broken, and immediately introduced into well-stoppered bottles.

The perchloride of iron thus prepared possesses a dark yellowish-red colour, no smell, and a very styptic taste. It is very soluble in water ; the solution, which is of a fine golden-yellow colour, keeps for an indefinite time exposed to the air without becoming turbid. It is also very soluble in alcohol and in ether.

Exposed to the air, it rapidly absorbs moisture, which it at first solidifies, but it soon afterwards deliquesces, so that it is necessary to keep it in dry well-stopped bottles.

This chloride possesses the great advantage of keeping a long time without undergoing decomposition, owing, no doubt, to the small quantity of water which it contains. Thus, the specimen which I possess, is now, eight months after its preparation, in the same state as when first prepared.

To determine the quantity of water which it contains, I took four specimens of the chloride, one of which had been prepared by M. Soubeiran, and the other three by myself. One gramme of each was decomposed by a gentle heat, and the decomposition assisted by the addition, from time to time, of a few drops of nitric acid. The four specimens afforded products of sesquioxide of iron very nearly the same. That prepared by M. Soubeiran afforded 0.393, and the three others, 0.392, 0.385, and 0.380. The mean of these four quantities is 3.875, which represents 26.86 per cent. of iron. But 26.86 of iron requires 52.58 of chlorine to form sesquichloride, so that it follows that 100 parts of the chloride consist of

Iron	26.86
Chlorine	52.58
Water	20.56
	100.00

This chloride contains about one-fifth of its weight of water, or rather less than five atoms, for five atoms would be in the proportion of 21.9 per cent. It corresponds with the hydrate, containing five atoms of water, of M. Fritsche.

The process that I propose, has then, the great advantage of affording a chloride entirely soluble, which has a composition sensibly uniform, and which may be kept for a long time, objects which have not hitherto been attained.—*Journal de Pharmacie.*

USE OF CHLORIDE OF SILVER IN EPILEPSY AND DYSENTERY.

M. Perri has administered the chloride of silver, in cases of epilepsy, in doses of one grain, four or five times a day; and, he says, it produces effects similar to the nitrate, but more distinctly marked.

In chronic dysentery, given in somewhat less doses, it produces immediately a diminution of the number of stools, and an amelioration of all the symptoms.

Judging from the analogy of the insoluble chloride of mercury (calomel), we should think the chloride of silver worthy of a fair trial.—*Lancet.*

ON THE PREPARATION OF PHARMACEUTICAL EXTRACTS.

BY M. BURIN.

In a work which I hope soon to publish, I have treated of the preparation of extracts in a series of articles, which, considered collectively, are founded on the following principles :—

1st. A vegetable substance being given, to endeavour to ascertain to which of its chemical constituents its medicinal activity should be ascribed.

2d. The active constituents being known, to study their chemical characters, in order to determine, among other things, the solvents which ought to be employed for separating these from such as are inert, and which on that

account may prevent the preservation of the product, or destroy the energy of its properties.

3d. To effect the evaporation of the liquid employed as the vehicle, in such a way as to avoid completely the decomposing action which organic bodies so readily undergo in contact with chemical agents, such as heat, air, and water.

Based upon these principles, I will here give an explanation of the mode of operating which I adopt for the preparation of some extracts, selected from amongst those most frequently employed.

BELLADONNA, STRAMONIUM, HYOSCYAMUS.

Most of the solanaceæ, and especially those named above, contain active principles, the chemical characters of which, and their action on the animal economy, are very similar.

In preparing the extracts of belladonna, stramonium, hyoscyamus, and some other solanaceæ, I take

The leaves and branches at the commencement of inflorescence,
Alcohol, sp. gr. 0.834, of each equal parts.

The plant is carefully crushed in a marble mortar, expressed with the hands, then again submitted to the action of the pestle. The juice obtained is added again to the plant, the alcohol is also added, and the whole allowed to macerate for six days. It is then thrown on to a strainer, and the marc submitted to the action of a powerful press. The liquors being put together and filtered, are distilled *in vacuo*, if possible, or otherwise over a water-bath, to recover the alcohol. In distilling over the water-bath, no alteration takes place in the product, as it is not exposed to the influence of the air. The residue is allowed to cool, and is afterwards filtered to separate the chlorophyle which is precipitated ; it is now evaporated *in vacuo*, or if the necessary apparatus is not attainable, the product is put out, to the thickness of four-fifths of an inch in large tin moulds, the surfaces of which have been rubbed with quicksilver, and left to spontaneous evaporation in a stove having a constant current of air heated from 95° to 104° Fahr. When the extract has acquired the consistence of honey, it is again dissolved in three times its weight of spirit, sp. gr. 0.834. It is then filtered, distilled over a water-bath to recover two-thirds of the spirit, and the evaporation completed in the stove.

The product should be preserved in closely stoppered bottles.

The object of dissolving the hydro-alcoholic extract in concentrated spirit, is to separate a certain quantity of salts which are soluble in weak spirit, and also the inert colouring matter. This method, however, is not new, it has, in fact, been already applied by M. Dublanc in the preparation of extract of lettuce, and by M. Lombard for extract of aconite ; finally, Messrs. Georges and Hespe have recommended its adoption in preparing the aqueous extracts of hyoscyamus and other solanaceæ from the dry plant.

The extracts of these three plants, prepared as above described, have a purpleish yellow colour when viewed in thin layers ; they possess the peculiar odours of the plants, have at first an acrid taste, afterwards the mouth becomes dry and clammy, with a feeling of constriction at the back of the throat, which is accompanied with an effect on the brain similar to that caused by a small quantity of tobacco smoke to a person not accustomed to it.

They powerfully dilate the pupil of the eye.

One part of the extract represents the principle soluble in water and in alcohol, of

88	parts of fresh	Belladonna, or	12	parts of	Powder.
110	"	Stramonium, or	12	"	
105	"	Hyoscyamus, or	16	"	

It is composed of yellow extractive, a complex body which retains a certain quantity of odorous volatile oil, and the whole of the crystallizable alkaline matter, or poisonous and medicinal principle of the plant, which is in a state of preservation that may be considered as perfectly normal, all chances of alteration that might have resulted either from the mode of operation or during the evaporation, being avoided almost entirely.

These extracts ought not to be employed excepting when specially directed by a medical man, and in no case should be substituted for those prepared in the ordinary way.

EXTRACT OF GENTIAN.

The observations of MM. Planche, Henry, and Caventou, and of M. Leconte, have shown the presence of the following substances in gentian: *volatile odorous principle, gentisine, gluey matter, green oily matter, uncrystallizable sugar, gum, pectic acid, fawn-coloured colouring matter, organic acid, and bitter extractive matter.*

MM. Henry and Caventon extracted from gentian a crystalline matter, which they considered, under the name of *gentianine,* as the bitter principle of gentian; but this substance, *gentisine,* as has been shown by MM. Leconte and Trommsdorff, is nothing more than a pale yellow colouring matter, which crystallizes in long needles, tasteless and inodorous, which is mixed in the *gentianine* with variable proportions of the bitter principle and of fatty matter.

It results from these facts, that the chemical nature of the bitter substance of gentian has still to be determined; and, as will be seen, in the state in which it is now obtained, it exhibits the form of an uncrystallizable extractive matter, very soluble in alcohol.

Gentian, in coarse powder,
Spirit, sp. gr. 0.834., aa, q. s.

The gentian is to be exhausted by Cadet's process, being treated three times successively with twice its weight of spirit. The liquors are put together and distilled over a water-bath to recover the spirit. The extract obtained is dissolved in distilled water, which takes up the bitter matter, the sugar, and the free acid, and leaves the fatty matter combined with the gentisine. It is filtered, and evaporation completed in the stove, and when the product has assumed the consistence of thick syrup, it is spread, by means of a brush, in thin layers over plates of tin, rubbed over first with quicksilver, and then with a cloth slightly moistened with oil of almonds. When the extract is dry, it is merely necessary to knock the back of the tin plate to detach it in beautiful yellow transparent laminæ, which should be preserved in well-stoppered bottles.

This extract, it will be observed, contains only the aromatic bitter matter of the gentian, the sugar, the free acid, and probably also a certain quantity of gentisine retained by the bitter principle. It represents the active principles of the gentian in a state of great concentration, and may form the basis of excellent preparations. One part of the extract is exactly equivalent to two parts of gentian root.

EXTRACT OF DIGITALIS.

As with gentian, three successive digestions with spirit, sp. gr. 0.834, entirely exhaust the digitalis of its bitter and odorous constituents. The liquors are mixed together; two or three litres of distilled water is added, or more, according to the quantity of matter under operation. The object of adding this water is to divide the chlorophyl, which otherwise carries down with it a considerable quantity of the active principles. It is then distilled over the water-bath to recover all the spirits, allowed to cool, and filtered to remove the chlorophyl. Proceeding afterwards in the same way as with the gentian, a dry extract is obtained in the form of fine transparent laminæ with very little colour, but possessed in a high degree of the bitter taste and peculiar

smell of digitalis. The smell becomes very perceptible on rubbing the extract, or moistening it with a little water. There can be no doubt that this extract is very energetic and preferable to all others; and that in the hands of an able practitioner it would form the basis of preparations possessing uniform medicinal activity.

One kilogramme (2.205 pounds) of digitalis in powder, afforded me 108 grammes (1666.872 grains) of dry extract; but taking into consideration the inevitable losses in operating on larger quantities, it may be considered that one part of extract is equivalent to ten parts of the dry plant.

This extract should never be substituted for the ordinary extracts unless specially ordered.

EXTRACT OF VALERIAN.

According to Trommsdorff's analysis, valerian root contains,

Volatile oil	soluble in alcohol.
Resin	soluble in alcohol.
Peculiar volatile acid (valerianic acid)	soluble in alcohol.
Aqueous extractive	soluble in water.
Peculiar substance	soluble in water.
Starch	soluble in water.

Experience has shown that the volatile oil, valerianic acid, and resin, are essentially the active principles of valerian; on the other hand, the aqueous extract is not without action. It is desirable, therefore, to introduce into the product as large a proportion as possible of the three first substances, the solvent for which is concentrated alcohol, and also to admit a certain proportion of the constituents soluble in water.

The following is the mode of operating which I recommend:—

Valerian in coarse powder, Q. P. Carefully moisten this with twice its weight of spirit, sp. gr. 0.834. After being in contact for three days, introduce the mixture into an ordinary displacement apparatus, and displace the liquor by an equal weight of spirit, sp. gr. 0.915. The first product being distilled over the water-bath, the residue will be almost entirely composed of a dark green resin, holding in solution the whole of the volatile oil and valerianic acid. This product should be set aside in a well-stoppered bottle. The spirit obtained by distillation is to be diluted with distilled water so as to reduce it to sp. gr. 0.915, and more spirit of this strength added if necessary, to exhaust the valerian. All the liquors are to be mixed and filtered, and the spirit recovered from them by distillation. The residue is evaporated in the stove to a pillular consistence, when the first product is to be incorporated with it while hot. A perfectly homogeneous mass is thus obtained, which represents in a perfect state all the active parts of the valerian root.

One part of the extract is equivalent to five parts of valerian.

OBSERVATIONS ON THE PRECEDING PAPER.

BY M. SOUBEIRAN.

The object proposed in the preparation of extracts is to concentrate into a small mass the active parts of plants, without at all changing the state of combination in which they naturally exist. M. Burin proposes to extend the use of rectified spirit, which had been previously recommended, for concentrating the active parts and separating the inert parts of plants. This object appears to me to be attained in regard to the *Solanaceæ*. Is it equally with regard to the other plants selected by M. Burin? I will only allude here to two sets of experiments, one on valerian and the other on gentian, the experiments being made, in each case, on the same roots, so as to have comparative results.

EXTRACT OF VALERIAN.

One kilogramme of the substance.	Extract obtained.	Relation to the substance.	Water dissolves.	Spirit sp. gr. 0.921 dissolves.	Spirit sp. gr. .834 dissolves.
Process of M. Burin.	255 gr.	:1::4	80 per cent.	88 per cent.	96 per cent.
Process of the Codex.	205 gr.	:1::4.83	88 per cent.	94 per cent.	80 per cent.

These two extracts were both very aromatic; that of the codex being, however, rather less so than the other, and its colour being darker.

I diluted them with water, and obtained the following results :—

M. Burin's Extract, diluted ... 800 to 1, specific odour destroyed.
——— 1000 to 1, specific taste destroyed.
——— 2000 to 1, bitterness destroyed.
Extract of the Codex, diluted 400 to 1, specific odour destroyed.
——— 800 to 1, specific taste destroyed.
——— 1000 to 1, bitterness destroyed.

The substitution of spirit, sp. gr. 0.834, for spirit, sp. gr. 0.921, does not therefore afford a very great advantage.

EXTRACT OF GENTIAN.

One kilogramme of substance.	Extract obtained.	Proportion.	Water dissolves.	Spirit sp. gr. 0.921 dissolves.	Spirit sp. gr. 0·834 dissolves.
Process of M. Burin.	112 gr.	:1::8.9	The whole except some flakes.	The whole.	96 per cent.
Process of the Codex.	364 gr.	:1::2.75	98 per cent.	85 per cent.	20 per cent.

Extract of M. Burin, diluted 10,000 to 1, bitterness still very perceptible.
——— 20,000 to 1, bitterness distinct.
Extract of the Codex, diluted 4000 to 1, the colour sensible, bitterness distinct.
——— 20,000 to 1, bitterness destroyed.

The extract made with spirit, sp. gr. 0.834, contains the bitter principle in a state of greater concentration; but what is the price at which this advantage is obtained? there is only one-third the quantity of extract. Spirit, sp. gr. 0.834, is not a very good vehicle for extracting the bitter principle from gentian root; when it has ceased to act, spirit, sp. gr. 0.921, will dissolve a considerable quantity of the active parts; the latter is, therefore, undoubtedly preferable for the preparation of the extract.

These two examples are sufficient to show the inconvenience that may result from adopting an absolute principle, and extending its application. In extracting the soluble matter contained in plants, it should not be forgotten that the solubility peculiar to each of the principles, when isolated, is no longer the same when several of these principles are associated, and that we must not judge, *à priori*, of the action of solvents upon each of them.—*Journal de Pharmacie.*

ON THE IMPURITY OF SOME DRUGS.

BY DAVID MURDOCH, ESQ.

(Read before the Philosophical Society of Glasgow, March 27, 1844.)

1. CALAMINE, OR CARBONATE OF ZINC.

As the calamine, or impure carbonate of zinc, sold in London, had been frequently examined by Dr. R. D. Thomson, and found always destitute of

zinc, it became a matter of some interest to ascertain if the same remark applied to the calamine which occurs in commerce in Glasgow. Accordingly, at the request of Dr. Thomson, a specimen was subjected to analysis. The colour of this substance is well known to be a light red. When it is boiled with muriatic acid, it effervesces slightly, and becomes perfectly white, the residue consisting of heavy white powder, which, on being heated on charcoal before the blow-pipe, and then digested in acid, gives out the smell of sulphohydric acid; and when fused with carbonate of soda and digested with water, sulphate of soda is dissolved and carbonate of barytes remains unacted on. The main constituent of the commercial calamine is thus, obviously, sulphate of barytes. To ascertain if any zinc was contained in the red powder, the acid solution which was boiled upon it was mixed with a quantity of caustic ammonia in excess, which precipitated the peroxide of iron and alumina. This precipitate was filtered, and the ammoniacal liquid which passed through the filter was precipitated by oxalate of ammonia. The oxalate of lime was thrown on a filter, and the washings evaporated to dryness and heated to low redness in a platinum capsule. No residue was left; showing the absence of zinc and magnesia.

140.11 grains of calamine gave, in one analysis sulphate of barytes and some silica, 128.05 grains; peroxide of iron and alumina, 11.55 grains; water, 0.51 grains; and the results of two analyses were as follow :—

	I.	II.
Sulphate of barytes	88.74	89.77
Peroxide of iron and alumina	8.01	5.74
Carbonate of lime	2.90	4.40
Water	0.35	0.35
	100.	100.26

Dr. Thomson having suggested that the mode in which this adulterated article was manufactured was by mixing together a portion of the American bole, chalk, and sulphate of barytes, the next object was to examine American bole, for the purpose of comparison. The following are the results of several analyses of this substance, which is used extensively for colouring tooth-powders, &c., by druggists. The fourth analysis was made by my brother, Mr. James Murdoch :—

	I.	II.	III.	IV.
Silica	50.15	47.31	...	49.38
Peroxide of iron	22.69	32.96	31.	30.44
Alumina	11.46	...	...	6.90
Lime	6.43	...	...	
Water	...	...	...	7.04
Sulphate of lime.....	...	...	...	8.30
Magnesia.....	...	...	...	1.98

To determine if any silica was contained in the sulphate of barytes of the adulterated calamine, the sulphate was fused with carbonate of soda, the fused mass washed with water until the sulphate of soda was removed, and then the residue was digested in dilute muriatic acid. A portion of silica remained undissolved; the quantity was not determined, but it is obvious that the calamine contains all the substances existing in American bole, and the conclusion is scarcely avoidable that the colour is caused by the presence of this body.

2. PRECIPITATED SULPHUR..

This substance, also termed milk of sulphur and washed sulphur, is properly prepared by boiling sulphur with lime or potash, precipitating the solution with muriatic acid, and throwing the precipitated sulphur on a filter and washing it. If this form of sulphur were always prepared in this

manner, no impurity would exist in it. But it has been observed that this article, in London at least, contains always above one-half its weight of impurity. To ascertain if this substance in Glasgow was equally impure, 53.85 grains were ignited in a platinum capsule, and were found to lose 29. grains. This would make the composition of the sulphur—sulphur 49.27, and sulphate of lime 50.73. But as the gypsum was in crystals, it obviously contained its water of crystallization, which must therefore be calculated. The constituents of hydrous gypsum, are—Ca O=3.5 S O_3 = 5 2 H O=2.25=10.75. The quantity of water belonging to the sulphate of lime found in the analysis, will therefore be 13.42 per cent. The true constituents, then, are,—

Sulphate of lime	50.73
Water of crystallization	13.42
Sulphur	35.85
	100.

3. OXIDE OF ZINC.

This oxide generally effervesces on the addition of an acid, proving the presence of carbonate of zinc or of the carbonate with which it has been precipitated. When, to the solution of this oxide in muriatic acid, an excess of caustic ammonia is added, some brownish-red flocks of peroxide of iron remain undissolved, containing, perhaps, a little alumina, amounting to about one-half per cent.

4. RED OXIDE OF IRON.

This oxide, as sold in the shops, has been examined by my brother, Mr. James Murdoch, and found to contain a small percentage of alumina.

5. TARTAR EMETIC.

This salt generally contains a small quantity of peroxide of iron.

Glasgow College Laboratory, April 1844.

Note by Dr. R. D. Thomson.—The first person who published an account of the extraordinary mixture called Calamine in the shops, was Mr. Brett, in the *British Annals of Medicine*, vol. i., p. 485. He found, however, traces of lead and zinc in the specimens which he analysed, a circumstance which has never occurred to me, either before or since that period. It is possible, therefore, that the specimens may vary slightly ; sulphate of lead is a probable ingredient, in minute quantities ; but I very much doubt if the manufacturer of this article is honest enough to supply his customers with even a trace of zinc. It is not a little remarkable that this adulterated article should have for so long a period been infesting every drug-shop, to the utter exclusion, apparently, of the genuine article in England and Scotland, without any complaint from those who purchased it. Does this fact not prove that as calamine is used in the form of ointment, it is the lard which is the efficient application. Mr. George Schweitzer, of Brighton, first published an account of the impure milk of sulphur in the *British Annals of Medicine*, in 1837, vol. i., p. 618, and showed that the sulphate of lime was introduced by substituting sulphuric acid for muriatic acid in the precipitation of the sulphur from its base. I may mention that this adulteration is easily detected by the microscope, the crystals of sulphate of lime being very apparent. It is not easy to discover any other method of excluding such adulterated articles from commerce, unless by the acquisition of a scientific knowledge of chemistry by the druggists of this country.—*Lancet.*

ON THE SOLUBILITY OF SULPHATE OF LIME IN WATER AT DIFFERENT TEMPERATURES.

BY M. LASSAIGNE.

The degree of solubility of pure sulphate of lime in water appears to have been but imperfectly known, for on referring to different chemical works, a great discordance is found to exist in the statements made on this point. Thus, Bucholz represents that one part of the salt is soluble in 460 parts of water at 59° Fahr., and in 450 parts at 212° Fahr. (*Thompson's System of Chemistry*). Berzelius, in his *Traité de Chimie*, states that the salt is not more soluble in hot than in cold water, and that one part requires $461\frac{7}{13}$ parts of water for its solution. On the other hand, Thénard gives 350 to 400, and Dumas and Desprets 250 to 500, as the proportions of water required.

Being desirous of knowing exactly the solubility of this salt in water, for the purpose of determining the degree of saturation of some waters in the neighbourhood of the capital, I undertook some experiments for that purpose.

A portion of very pure laminated gypsum was reduced to fine powder, and placed in contact with distilled water, in a corked bottle, which was frequently shaken from time to time during thirty-six hours, and kept at a temperature of 50° Fahr. The decanted solution was placed in a poised platinum capsule, and evaporated to dryness. The weight of the sulphate of lime after calcination, was found in two experiments to be 0.031, and 0.029 from 10 grammes of liquid. This first result, then, determines that the solution was composed of 9.970 of water and 0.030 of sulphate of lime, or of one part of the salt to 332.3 of water, at 50° Fahr.

Solubility at 212° *Fahr.*—After boiling, for a quarter of an hour, distilled water with an excess of pure pulverized gypsum, the solution was filtered, and allowed to cool to 50° Fahr. The liquid remained perfectly transparent, and no crystals were deposited on the surface of the vessel in which it was contained. Submitted to evaporation in a poised platinum capsule, the quantity of sulphate of lime obtained after calcination, was precisely the same as that afforded in the previous experiment, when the solution was made at 50° Fahr.

These experiments demonstrate that sulphate of lime is not more soluble in hot than in cold water, as was already stated by Berzelius, and that it may be dissolved in 332 times its weight of water, being, therefore, a little more soluble than most Chemists have considered it.—*Journal de Chimie Médicale.*

OBSERVATIONS ON THE GREEN TEAS OF COMMERCE.

BY ROBERT WARINGTON, ESQ.

(*From the Proceedings of the Chemical Society.*)

In examining lately some samples of tea which had been seized, from their being supposed to be spurious, my attention was arrested by the varied tints which the sample of green tea exhibited, extending from a dull olive to a bright greenish-blue colour. On submitting this to the scrutinizing test of examination by the microscope, with a magnifying power of one hundred times linear, the object being illuminated by reflected light, the cause of this variation of colour was immediately rendered apparent, for it was found that the curled leaves were entirely covered with a white powder, having in places a slightly glistening aspect, and these were interspersed with small granules of a bright blue colour, and others of an orange tint; in the folded, and consequently more protected parts of the curled leaves, these were more distinctly visible. By shaking the whole of the sample mechanically for a short time, a

quantity of powder was detached, and from this a number of the blue particles were picked out under a magnifying-glass, by means of the moistened point of a fine camel's-hair pencil. On being crushed in water between two plates of glass, they presented, when viewed by transmitted light, a bright blue streak. This change in the method of illuminating the object, was necessary for the purpose of seeing the action of the following tests:—A minute drop of a solution of caustic potash was introduced by capillary attraction between the glass-plates, and the blue tint was immediately converted to a dark bright brown, and the original blue colour again restored by the introduction of a little dilute sulphuric acid. It was therefore evident that these particles consisted of the ferrocyanide of iron, or Prussian blue. The orange granules, on examination, proved to be some vegetable colouring substance.

To ascertain, if possible, the nature of the white powder observed on this sample, I separated some of the dust, and heated it to redness with free exposure to the air; the whole of the vegetable matter and Prussian blue was thus destroyed, and a white powder, with a light shade of brown, was obtained. This dissolved by boiling in dilute hydrochloric acid, and when tested with solution of chloride of barium, gave indications of sulphuric acid: it was then evaporated to dryness, and again acted upon by very dilute hydrochloric acid; a trace of silica remained undissolved. Solution of ammonia being added, threw down a little alumina and oxide of iron; and the ammoniacal solution, treated with oxalic acid, gave a precipitate of oxalate of lime. A second portion of the powder, after calcination, was boiled for some time in distilled water, and yielded a solution containing sulphate of lime; this latter substance, therefore, and some other body, containing silica, alumina, and, perhaps, lime, formed the white powder observed. This substance I believe to be kaolin, or powdered agalmatolite, the figure-stone of the Chinese. I venture this conjecture not only from the ingredients found, but also from the gloss which the rubbed parts of the curled leaves always assume, and which these materials would be well fitted to produce.

Four or five other samples of green teas were then submitted to the same method of examination, and only one of them proved to be free from these blue granules; this sample was a high-priced tea, and had been purchased about two years: it appeared covered with a very pale blue powder, instead of the white with the blue particles interspersed, as exhibited by the others.

Being still in doubt as to whether this powder and colouring was an adulteration practised in this country or not, I applied to a most extensive wholesale dealer of the highest respectability, and from him obtained a series of samples, each being an average from a number of original chests, and from these I gathered the following results by examination, as before, with the microscope: No. 1. Imperial. The leaf, where seen beneath the superficial coating, was of a bright olive-brown colour, with small filaments on its surface; it was covered with a fine white powder, and with here and there a minute bright blue particle, at times having the appearance of a stain. No. 2. Gunpowder. Similar to No. 1, but the filaments not visible: this may have arisen from the tight and close manner in which the leaf was curled. No. 3. Hyson. The same as No. 1, the blue particles being, perhaps, more frequent. No. 4. Young Hyson. The same. No. 5. Twankey. The leaf of this had more of a yellow hue, and was profusely covered with white powder, having the blue particles also more thickly strewn over the surface. It was evident from the examination of these teas that they arrive in this country in an adulterated or factitious state.

On detailing what I had thus found to the friend who had favoured me with the preceding samples, he inquired if I had examined any *unglazed teas*. This appellation immediately arrested my attention, and I requested to inspect some of them, and found that they possessed externally a totally different aspect; indeed, as far as their colour was concerned, not to be like green teas.

They were of a yellow-brown tint, without a shade of green or blue, but rather tending on the rubbed parts to a blackish hue. I afterwards received two samples of unglazed teas, specified as of very fine quality, accompanied by two others of the ordinary, or, as they are called in contradistinction, *glazed* varieties, also of a very superior quality. These were, therefore, immediately submitted to examination. No. 6. Unglazed Gunpowder. It presented the same colour under the microscope as when viewed by the unassisted eye; was filamentous, and covered with a white powder, inclining to a brown tint; but no shade of blue was visible. No. 7. Unglazed Hyson. The same as No. 6. No. 8. Gunpowder glazed. Filamentous, covered with a powder of a very pale blue, and the blue granules being but rarely seen. No. 9. Hyson. The same as No. 8. No. 10. Pidding's Howqua, purchased at Littlejohn's, at eight shillings and sixpence per catty package. This was evidently of the glazed variety; it was filamentous and covered with a pale blue powder interspersed with bright blue granules. No. 11, entitled Canton Gunpowder. This was a splendid sample of the *glazed* variety, as far as colour was concerned; it was more thickly powdered and blued than any that I have examined, and the dust rose from it in quantity when poured from one paper to another. A great many other samples of ordinary green teas were examined, with much the same results; the cheaper teas, or those in general use, and which form the bulk of the imports, being similar to Nos. 5 and 11, and being represented by Twankeys and low-priced Hysons or Gunpowders.

After several unsuccessful experiments, I found that with a little care the whole of this powder or facing, if I may be allowed the term, it being entirely superficial, could be easily removed from the tea, by simply agitating the sample briskly for a few seconds in a phial with distilled water, and then throwing the whole on a lawn or muslin filter, in order to strain the liquid, with the suspended matter, from the leaves as rapidly as possible. After this operation the tea presented a totally altered aspect, as may be supposed; in fact, changing its colour from a bluish-green to a bright and lively yellow or brownish-yellow tint; and I found that with care it could be redried, at a temperature below 212°, without even uncurling the leaf, and without apparent loss of any of its characteristic qualities. When the drying was complete, the sample appeared nearly as dark as the ordinary black teas, and when examined by the microscope, presented a smooth surface, perfectly free from the previously observed facing, and having all the characters of black tea, with the exception of the corrugated aspect which is common to the greater part of the teas of the latter variety, and which evidently arises from their having been exposed in the operation of drying to a much higher temperature. The greenish-coloured turbid liquid, which passed through the meshes of the muslin filter, was allowed to deposit the matter suspended in it, which was then washed and collected. These sediments, obtained from various samples, were submitted to the following course of chemical examination:—They were, in the first instance, tested with a solution of chlorine gas in water, to ascertain if the colouring material was indigo or other vegetable colour: this substance, as we shall presently see, having been supposed by some persons to be the one employed by the Chinese for the purpose of imparting the blue tint to some of their green teas. In no case, however, that I have yet examined have I found this to be the case; but the colouring agent has invariably proved to be the ferrocyanide of iron or Prussian blue. The presence of this compound was next evidenced by adding a small drop of caustic potash to a little of the sediment under examination, when the green hue was instantly converted to a bright reddish-brown, the original blue appearance being again restored by the subsequent addition of a little diluted sulphuric acid. The other ingredients of the facing were sought for in the manner stated in the previous part of this paper, and also by heating a part of the sediment, after calcination and free exposure to the air, with carbonate of soda, to fusion, which, in the case

of sulphate of lime being present, formed sulphate of soda and carbonate of lime, and these were each subsequently tested for.

By these means, Nos. 5, 8, 10, and 11 were found to be faced with Prussian blue and sulphate of lime. Nos. 6 and 7 gave no indication of Prussian blue, but of sulphate of lime only. The sulphate of lime from some samples appeared to be crystallized gypsum reduced to a fine powder; the coarser particles still exhibiting a crystalline structure.

Through the kindness of Mr. Greene, of the East India-house, I was enabled to obtain samples of the Assam teas in a genuine condition: No. 12. Imperial, No. 13. Gunpowder, and No. 14. Hyson. They had none of the blue granules; were very filamentous, and presented the same appearance as the unglazed varieties, but brighter in colour; the facing was apparently sulphate of lime. No. 15. Assam Hyson, of the last importation; it was of the unglazed variety, with the superficial white powder having a slight brown tint, and consisting of a minute quantity of sulphate of lime with a little alumina.

It appears, therefore, from these examinations, that all the green teas that are imported into this country are faced or covered superficially with a powder consisting of either Prussian blue and sulphate of lime or gypsum, as in the majority of samples examined, with occasionally a yellow or orange-coloured vegetable substance; or of sulphate of lime previously stained with Prussian blue, as in Nos. 8 and 9, and one of those first investigated; or of Prussian blue, the orange-coloured substance with sulphate of lime and a material supposed to be kaolin, as in the original sample; or of sulphate of lime alone, as in the unglazed varieties. It is a curious question what the object for the employment of this facing can be; whether, as when sulphate of lime alone is used, it is simply added as an absorbent of the last portions of moisture which cannot be entirely dissipated in the process of drying; or whether it is only, as I believe, to give that peculiar bloom and colour so characteristic of the varieties of green tea, and which is so generally looked for by the consumer, that the want of the green colour, as in the unglazed variety, I am informed, affects the selling price most materially. This surely can only arise from the want of the above facts being generally known, as it would be ridiculous to imagine that a painted and adulterated article, for such it must be really considered, should maintain a preference over a more genuine one. In looking over the various authors who have written on the subject of tea, I have observed the following curious statements bearing on the above subject, and fully confirming many of my results, and with which I shall close the present communication.

[*To be continued in our next.*]

DESCRIPTION OF THE FRANKINCENSE-TREE,

As found near Cape Gardufoi, on the Somauli Coast.

BY CAPTAIN G. B. KEMPTHORNE,

Indian Navy, Commanding the Hon. Company's Sloop of War "Clive."

At Bunder Cassim, about one hundred miles to the eastward of Berbera, the mountains come close down to the coast; there is a pass and road over them, and a few hours' walking will, it is said, lead to a fine climate, and to a beautifully fertile country, abounding in the elephant, the rhinoceros, and the lion, and thickly populated by pastoral tribes. Several rivers take their source in the high land, and flowing to the southward and eastward, fall into the Indian ocean, four or five degrees north of the equator.

The chief town of the Mijertheyn Somauli is at Bunder Maryah, which lies twenty miles south west of Ras Feeluk. The range is here about 5000 feet in altitude, and three miles from the shore. Ascending 1000 feet, a

wide plain presents itself, bounded on every side by precipitous mountains, studded with the dragon's blood, frankincense, and gum acacia-trees, but looking bare and naked from the total absence of underwood.

The *luban* or frankincense assumes the most singular aspect, from the fact of its invariably growing from the bare and smooth sides of the white marble rocks of which these hills are composed, without any soil whatever to nourish or the least fissure to support it. Many of the trees have even attached themselves to the huge masses that have rolled down into the valley, and now lie over the stony surface. From the base of the trunk, and about treble its diameter, a very round thick substance is protruded, of a nature between bark and wood. This adheres most firmly to the stone, and at a distance resembles a mixture of mortar and lime. From the centre of the mass the stem, having first taken a bend or curve outward of several inches, rises straight up to a height of forty feet. It throws from the top short branches, covered with a very bright green foliage, the leaves being narrow and rounded at the end, five or six inches in length by one broad; crimped, like the frill of a shirt, or rather bearing a stronger resemblance to that beautiful species of seaweed found along the coast of England, and styled by urchins, "the old gentleman's ruffles."

From a foot to eighteen inches is the usual girth of the stem, and it tapers gradually away to the summit. The bark is perfectly smooth, and consists of four distinct layers. The outermost of all is very thin, and similar to that of the beech. The two next are of a singularly fine texture, resembling oiled letter-paper, perfectly transparent, and of a beautiful amber colour. It is used by the Somauli to write upon. The inner bark of all is about an inch thick, of a dull reddish hue, tough, and not unlike leather, but yielding a strong aromatic perfume. The wood is white and soft, and might be applied to many useful purposes. By making a deep incision into the inner rind, the gum exudes profusely, of the colour and consistency of milk, but hardening into a mass by exposure to the atmosphere.

The whole mountain-range from Bunder Maryah to Cape Guardufoi is composed of limestone and marble; and near the latter place especially the marble is so white and pure, that it approaches to alabaster. Pink and greyish-black are also common colours; and in parts it might be mistaken for sandstone, until chipped off with the hammer. On the plain visited, the frankincense is nowhere to be found resting upon the ground, or upon any sort of soil; and the purer the marble to which it adheres, the finer the growth of the tree. It would seem that this singular production of the vegetable world derives its sole nourishment from carbonate of lime. The young trees produce the best and most valuable gum; the older merely yielding a clear glutinous fluid resembling copal varnish, and exhaling a strong resinous odour.

During the south-west monsoon, the pastoral tribes in the neighbourhood of Ras Feeluk collect large quantities of frankincense, which they barter to the Bonians, of whom a few reside at the villages along the Abyssinian coast. Boats from Maculla, and from other ports on the opposite Arabian shore, also come across during the fine season, and carry away the gums that have been accumulated, and which are exchanged for a coarse kind of cotton cloth worn by the Somauli.—*Harris's Highlands of Œthiopia*, vol. i., p. 417. 2d. edit. 1844.

[There are two kinds of olibanum or frankincense described in pharmacological works, one called *Indian olibanum*, which is obtained from the *Boswellia surata*, the other denominated *African* or *Arabian olibanum*. The latter is obviously the one referred to by Captain Kempthorne. As found in commerce, it is always intermixed with crystals of carbonate of lime. No botanical description of the tree yielding it has yet been published.—Ed.]

MEDICAL REFORM.

LETTER FROM DR. HODGKIN TO SIR JAMES CLARK, BART.

(From the Medical Times.)

My dear Friend,—Thy views on the subject of Medical Reform, explained and advocated in thy letters to Sir James Graham, appear to be so well adapted to the present exigencies of our profession, and to accord so well with the wishes of its judicious members, that I cannot but desire that they may, to a great degree, be carried out by the bill which is about to be passed. Although I am far from thinking that it would be expedient either to abolish altogether or to re-construct, the two great existing chartered bodies, the Colleges of Physicians and Surgeons, I regret that partial legislation should so far precede the general, as to give these bodies their new charters, before the passing or even publication of the general measure.

In principle the step is objectionable, and practically it will be productive of serious inconvenience and difficulty. I think it should not be forgotten that to the Apothecaries' Company we are bound to ascribe much of the improvement which has been effected as to the average of acquirement at present possessed by the general practitioners throughout England, and I cannot help desiring to see a full measure of justice dealt out to that body, when the two other bodies are receiving so much of royal favour.

The immediate object of this letter is to place in a connected whole several points which I have already had the pleasure of throwing before thee in conversation, and by which, it appears to me that thy own plans may be effectually accomplished.

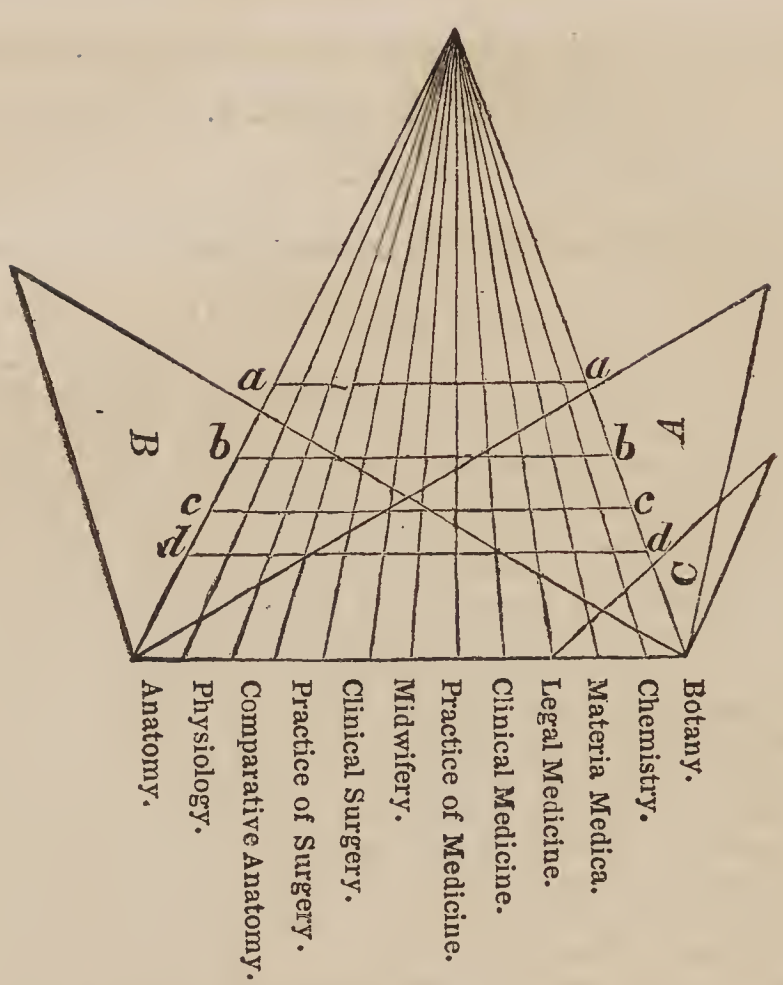
I would assume, in the first place, that there be a common examination for the licence to practise to be submitted to by all, whether their object be to apply themselves more particularly to Medicine or Surgery, or to combine the two—that for the convenience of students, examining boards for the granting of this licence should sit in London, Edinburgh and Dublin, granting diplomas on the same terms, and, as far as may be, equalising the severity of their tests.

This examination may be considered as a state or legal examination, whilst other examinations are to be regarded as academic.

Though *bonâ fide* degrees in Medicine and Surgery should only be attainable from the recognised universities of the kingdom, or from such foreign universities as may by courtesy be allowed to entitle their graduates to proceed *ad eundem gradum,* the examiners for the licence might, I think, be permitted to receive testimonials of proficiency tested by examination from other academic bodies specially permitted to grant them.

I make this proposal merely to avoid the apparent severity of driving all students to some university for academic examination, though I hold it to be very desirable, and even expedient, that they should voluntarily adopt this course.

The mutual relations between the examinations for the licence to practise, and those for academic degrees, and also between these and the Colleges of Physicians and Surgeons, and the associated body of Pharmaceutists, will, perhaps, be rendered most easily intelligible by reference to the accompanying diagram.



(*A*) College of Physicians.
(*B*) College of Surgeons.
(*C*) Pharmaceutical Body.
(*a*) Doctor of Medicine or Surgery.
(*b*) Second Academy Examination for B.M. or B.Ch.
(*c*) State or Legal Examination.
(*d*) First Academy Examinations.

At the base of the triangle are seen the departments of scientific and practical knowledge required for Medicine, Surgery, and Pharmacy. Of the pharmacien is demanded but a limited number of these acquirements, but he may carry them to their highest pitch, and receive corresponding honour and credit for his proficiency. It is important that he should seek these acquirements in the same schools with professors of the other departments. Their future cordial co-operation—their mutual understanding of each other—and their common direction to the same objects, could scarcely be secured by their systematically frequenting different schools. The pharmaceutist, however, has nothing to do with the state examination in medicine, but presents his testimonials of competent or proficient acquirement in his peculiar departments, and is received or rejected by the PHARMACEUTICAL SOCIETY, upon grounds on which that body should be as competent to decide as the Colleges of Physicians and Surgeons are with respect to the claims of their candidates. The safety of the public would, however, be consulted by the enforcing of a limited but practical state examination for the pharmacien, as well as for the physician and surgeon.

Above the line indicating the state examination, are placed those which mark the Batchelor's and Doctor's degrees in medicine and surgery. There will consequently be no danger of any university being subjected to the degradation of seeing its graduates rejected at the state examination, except in particular cases, in which the ordinary course may have been deviated from, and in such cases discredit could hardly be produced.

Let us next consider the relation which the Colleges of Physicians and Surgeons would bear to this scheme.

It is to this subject I wish to invite particular attention, as it is mainly concerned in the adjustment of the differences which now divide our profession.

1st, Of the College of Physicians.

So long as the term* Physician is understood to mean medical men who are worthy of the doctor's degree, and whose design it is to occupy the position of consulting practitioners, the college should adhere to its former practice of admitting those only who have proceeded to the Doctor's degree. By deviating from this practice it may doubtless admit some very competent men, but it runs the risk of doing otherwise, and manifestly depreciates the honour and privileges which it is understood to confer; and it is not to be presumed that a medical man, every way suitable for admission into the College of Physicians, would fail in the preliminary step for obtaining a Doctor's degree. Admission to the college would therefore require the production of certificates of having passed the state examination, of having received the Doctor's degree from certain recognised Universities, of having attained a certain age, and of having been engaged a certain period in practice or professional studies of a practical nature, together with the proofs of respectability of character. The satisfactory production of these proofs should entitle the candidate to be enrolled amongst the fellows of the College. There is, however, one case to be provided for. The professional studies and the Doctor's degree may have been received in some foreign school, of the precise value of which ignorance or doubt may exist, and yet such individuals may have the opportunity of entering the College with the minimum of required knowledge. This, however, could be easily guarded against. There would then be perfect equality of the Fellows of the College, but provision would be required for the constitution of the Council. The close character of this board forms its obnoxious feature, and subjects even its unexceptionable acts to suspicion. To obviate this, I would recommend that two-thirds of the Council should consist of such ordinary members or fellows as will come on by rotation in the order of their standing, without reference to place of residence, professional distinction, party, or any other less worthy title. They should remain on the Council for a certain period, say four or five years, and not come on again, on this footing, unless it should again come to them by rotation. Any fellow may, however, waive his right to be on the Council after it has come to him in due course. The remaining third should be elected by the council, having been proposed and duly announced to its members individually a certain period prior to their election.

The third part so elected should be chosen from the ordinary members generally, on grounds of which the Council should be the judges. This third would necessarily constitute the working part of the Council, and their mode of nomination would enable the body to avail itself of the choicest talents of the profession for every important and worthy object. At the same time the mode of determining the other two-thirds would secure the existence of a majority of such a character as, if the occasion required, would have it in their power to check any party movement, so as to obviate all jealousy on the part of the body at large, much more effectually than could be done by any elective process, which the scattered members of the college, widely differing as to their energies, leisure, and interest in the subject, could permanently and generally adopt. The two-thirds would be the honoured guardians of the privileges of their body. They would be

* It has been contemplated to extend the application of this term—See "*Remarks on the Practice of Medicine, by a General Practitioner.*"

looked to as such by their brethren, in return for which they could scarcely regard it as a hardship to hold themselves in readiness for any emergency during the limited period of their office.

2dly, College of Surgeons.

The premature concession of a new charter to this body, which has infused so much general discontent amongst its ordinary members, seems to preclude the possibility of legally enforcing the same principle which has just been laid down for the College of Physicians, but I conceive that it might with so little change be made to apply to the body under its present charter, that it will be quite possible for the present Council to introduce it by a modification of its by-laws.

It appears to me that the adoption of a plan similar to that which I have just sketched, would ensure an amount of publicity and equality which should satisfy the most democratic member of our profession, at the same time that the executive boards required for the management of the affairs of the profession, might proceed with their duties undisturbed by the jealousy or needless interference of their fellow members. The highest honours, as well as grades of his profession, would be open to every medical man by the effectual exertion of his talents and acquirements, whilst those who remain in less conspicuous positions, amongst the various causes which they might assign for the fact, could never ascribe it to the partiality or injustice of self-elected bodies.

Before I conclude, I have only to add a few words regarding the boards for conducting the state examination.

The Government, under whose direction these boards would necessarily be placed, should send the requisition to the Councils of the College of Physicians and Surgeons, and to that of the body of Associated Pharmaceutists, calling for the nomination of a certain number of examiners in each department. They should not, however, elect those who are Members of Council for the time being, but appoint a few Members of the Council to act as a committee of examination, whose duty it should be to confer with the examiners, in order to ensure the efficiency and, as far as possible, the uniform severity of the examinations.

The safety of the public, the character of the profession, and the interests and privileges of the constituted bodies, would, I believe, be perfectly secured by measures of the kind which I have suggested, and individuals would at the same time be very secure against the possibility of exclusion from the colleges, through anything bordering on jealousy or intrigue.

Local jealousies, to which, unhappily, the present system forms an opening, could scarcely be admitted, seeing that the state examination, when passed at any of the boards, would qualify for practice throughout the British dominions, and the perfect equality of fees and, as far as possible, of tests would give none the preference on the ground of economy or facility. The different colleges, also, should, as far as possible, equalize their expenses, and the transfer of membership from one to another, which convenience may require, might be readily effected on the payment of a moderate fee.

There would still be some competition between the various medical schools, but it would be a competition of the most open and honourable character, and pupils would be mainly attracted by the success and celebrity of the teachers, or by the convenience of locality.

Thine sincerely,

Thos. Hodgkin, M.D.

REVIEW.

First Lines for Chemists and Druggists *preparing for Examination before the Board of the Pharmaceutical Society.* By J. Steggall, M.D., &c. &c. *London: John Churchill, Princes Street.* 12mo, pp. 169.

This little book is likely to be useful to apprentices. It contains a concise explanation of the processes in the Pharmacopœia, a tabular arrangement of the most important medicinal plants, a description of the thermometers used in this and other countries, weights and measures, and methods of taking specific gravities. It concludes with a series of questions on Pharmaceutical Chemistry, which are calculated to impress on the memory of the student the substance of what he has read. In recommending the work, we must not be supposed to offer an opinion on the system of grinding, as practised on medical students, which, in some cases, enables ignorant young men to pass an examination.

LETTER FROM MR. M'CULLOCH.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

95, *Bishopsgate Street, May* 23*d*, 1844.

Dear Sir,—I am exceedingly sorry that very urgent and unexpected business prevented me from being present at the General Meeting of the Pharmaceutical Society on Tuesday last, as I have been requested by a large and highly respectable class of Druggists in the country to inquire, if it was the intention of the Council to make any distinction between the town and country Members, as very general dissatisfaction appears to exist from the circumstance of the Members in the country paying the same subscription as those in London, who derive nearly all the advantages of the Association; in fact, from the numerous complaints I have heard, I think if some arrangement is not made, calculated to place the country subscribers on a more equitable footing, it will prove very detrimental to the welfare of the Society.

I am, dear Sir, your obedient servant,

William M'Culloch.

[According to promise, we insert the above communication, which arrived too late for last month. At the same time we cannot agree with our Correspondent in considering the difference between the advantages enjoyed by

London and Country Members, so great as he appears to think. All are equally interested in the proper representation and protection of the trade, in being connected with an influential body, in the prospect of becoming identified as a part of the Profession, and thus enjoying a larger share of public confidence. A very small proportion of the London Members are able to leave their business to attend the Meetings and Lectures; those who attend, often do so at considerable inconvenience, on account of their other engagements.

With respect to the subscription, we have always looked forward to a general reduction sooner or later; but our original opinion is unaltered, namely, that, in the first instance, a smaller subscription would not have been adequate to the objects to be attained. The success of the Society depended upon its being commenced in a respectable manner, and the heavy expenses attending the founding of an Establishment, obtaining a Charter, and raising a Benevolent Fund, demanded a liberal supply of means from the Members, many of whom, in addition to their subscription, gave donations of five or ten guineas. We are also quite certain that if the subscription for Members had been fixed at a guinea, many would have complained because it was not half the amount, and even had it been half-a guinea, there would have been some who thought this too much. We regret to see so little public spirit among the Chemists;—the Tailors, the Linen-drapers, the Butchers, the Stationers, in fact most other classes, unite liberally among themselves for mutual protection and benefit; the Chemists, who ought to set an example, are very much behind them all. We trust that the subject of the subscription will be re-considered by the Council during the present year.—Ed.]

THE RETIREMENT OF MR. PAYNE FROM THE OFFICE OF PRESIDENT.

We should be neglecting a duty which we owe to one of the most energetic and active Members of the Council, if we were to allow this opportunity to pass without making an allusion to the valuable services which Mr. Payne has rendered to the Society since its commencement, and the unfortunate circumstance which has obliged him, for the present, to suspend his exertions. We have reason to fear that the arduous duties of the office he has lately filled have tended to increase the indisposition which now obliges him to seek retirement, and on this account especially, we feel called upon to bear testimony to the obligations the Society owes to so indefatigable a Member.

It will be readily believed by those who have had any experience in the organization of public institutions, that this is an arduous and formidable task. The consideration and discussion of the plans of proceeding, the compilation of the laws and regulations, the arrangement of the various committees, and the correspondence which these matters entail upon the active managers, involve an amount of exertion and excitement which nothing but a disinterested zeal in the cause would induce any persons to endure.

In all these proceedings Mr. Payne has, from the formation of the Society, taken a leading part. As Vice-President for above two years, and lately as President, he was *ex officio* member of every committee, and was always at his post, until his health obliged him in some degree to relax.

The Members who have attended the meetings and evening lectures can bear ample testimony to his judgment and efficiency as Chairman, and the satisfactory manner in which he performed the more public duties of his office: but none can fully appreciate the extent of his assiduity, zeal, and moral worth, but those who have worked with him in the daily consultations and frequent preparatory meetings in which he took so prominent a part.

For several months the health of Mr. Payne has been unequal to the labour attendant upon his office, and we have on several occasions seen him at the Council table when he ought to have been recruiting his strength in the country. At length a severe attack of indisposition obliged him to withdraw from all active employment, and he was confined to his room for several weeks. We are glad to hear that he is gradually regaining his health, and we sincerely hope that a few months of relaxation will enable him again to assist in the management of the Society.

APPOINTMENT TO THE CHAIR OF CHEMISTRY AT EDINBURGH.

The vacancy caused by the resignation of Dr. Hope, the late Professor of Chemistry at Edinburgh, has been filled up by the election, on the 14th of May, of Dr. William Gregory. Although there were a great many candidates for this appointment originally in the field, all excepting two, Dr. Gregory and Dr. Fyfe, had resigned before the day of election. The election rested with the Town Council of Edinburgh, and the numbers of votes given for the respective candidates were, for Dr. Gregory, 20; for Dr. Fyfe, 14. We understand that the result of the election has given general satisfaction.

DEATH OF DR. HOPE,

Late Professor of Chemistry.

We regret to announce the death of this learned gentleman, who for nearly half a century has filled the Chair of Chemistry in Edinburgh University, which event occurred at his house in Moray Place, at about a quarter past one o'clock in the morning of Thursday last. The doctor's health has been failing considerably during the last few months; and on Friday, the 7th instant, we understand, he was struck by paralysis, from the severity of which he never rallied. He had very nearly completed the 77th year of his age. At the close of the winter session before last, he felt himself compelled, by increasing years, to resign the profession which he had so long and so ably filled.—*Scottish Record (Athenæum).*

TO CORRESPONDENTS.

G. F. B. (1).—French chalk is a species of indurated talc. It probably consists of nearly the same constituents as steatite; namely, silica, magnesia, alumina, iron, and potash. It occurs in Perthshire and other parts of Scotland, in Sweden, Saxony, Silesia, Austria, and Switzerland.—(2.) Stains are sometimes removed from marble by means of a mixture of soft soap, soapmakers' ley, and quicklime, made into a paste, and laid over the surface of the marble, where it should be allowed to remain for several days.

S. W.—Protonitrate of mercury may be made by gently heating together excess of mercury with nitric acid, sp. gr. about 1.2, until nitrous vapours have ceased to appear; then boiling the solution over the undissolved mercury which remains.

W. H. — We understand that the *camphine* now employed for burning in the patent lamps is nothing more than oil of turpentine.

E. G. F.—Starch test-paper is made by dipping paper into a solution of starch.

A. P. S. (Liverpool.)—For the formula and explicit directions for making syrup of protiodide of iron, *see* vol. i., pages 47 and 520 of this journal.

M. P. S. (Lynn)—For some information on the preparation of Syrup of Poppies, and other Syrups, *see* vol. ii., pages 448 and 647, of this journal.

W. H. (1.) wishes for a formula for Citrate of Quinine and Iron.—(2.) Benzoate of Ammonia is made by saturating benzoic acid with carbonate of ammonia, and carefully evaporating the solution at a low temperature.

R. E. (Rochdale.)—(1.) We know of no authorised formula for Dec. Cinchonæ Comp. Is it not Dec. Cinchonæ Cord. of the London Pharmacopœia?—(2.) Gregory's Powder, as sold in Edinburgh, is a mixture of rhubarb, magnesia, and ginger, with sometimes powdered chamomiles.—(3.) What decomposition takes place in making gooseberry pudding; for when made with unripe sour gooseberries, it is less acid, and requires less sugar to sweeten it, than when made with ripe and comparatively sweet fruit? [The phenomena above alluded to must be familiar to most persons; but the explanation is not very obvious. There is probably some fallacy in what appear to be the facts of the case, which it would be desirable to investigate by experiment.]

"An Associate" (Brighton).—We are not acquainted with a method of making *effervescing lemonade* without a machine.

A. B. inquires, Is the Resin of Jalap (the article in a twisted cone, with a hollow in the middle) an imported article; and if so, from what place is itbrought? [We are unacquainted with the article described.]—(2.) Should Pulv. Scammon. Comp. be made with the dried extract of jalap, or with the article described above? [Hard extract of jalap, and not resin of jalap, is ordered in the Pharmacopœia.]—(3.) The same formula is given by the London and Dublin Colleges for Pulv. Scammon. Comp.—(4.) For Jalap Resin, *see* Pereira's *Materia Medica*, page 1272.

S. B.—The genuineness of croton oil may be determined as follows:—Add to the specimen of oil an equal volume of absolute alcohol in a tube; if the oil be genuine, a perfect combination will take place on applying a moderate degree of heat, and the fluid will remain transparent while the heat is continued. But as the mixture cools, the oil and alcohol will separate, and the former will assume rather more than its original bulk, retaining about four or five per cent. of alcohol combined with it. With reference to essential oils, *see* the last number, p. 598.

L. C.—(1). The disengagement of the carbonic acid gas during fermentation would probably take place more copiously in stone than in glass vessels, in consequence of the rough surface of the former. (2.) The first six numbers of this journal may be obtained from any bookseller in town or country.

T. D. states, that the following mixture becomes thick, and in its external character very much like coloured white of egg:—

℞ Sodæ Sesquicarb. ℥j. et ℥j.
Acid. Tart. ℥j.
Aq. q. s.
Syr. Croci.
Vin. Ipecac.
Sp. Æth. Nitr. aa ℥j.
Aquæ. q. s. ad ℥xxxij.

E. P. says he has not been able to obtain any satisfactory results in the use of Trommer's test for distinguishing grape from cane sugar, and alludes to Dr. Ure's statement, published in this journal, July, 1842, to the effect that he had met with the same difficulty, but had modified the process so as to render it available. E. P. expresses a hope that Dr. Ure will publish the details of his process.

"An Associate of the P.S." questions the correctness of a statement made in vol. ii, page 612 of this journal, that spirit 56 over proof by Sykes's hydrometer, corresponds with the rectified spirit of the Pharmacopœia, sp. gr. 0.838. Our statement accords with the published tables of Dallas and of Gilpin, which are generally received as correct; we will, however, give a further explanation of the points alluded to by our Correspondent in the next number.

Z.—(1). *Parnell's Elements of Chemical Analysis.*—(2). We know of no book in which our Correspondent will find much useful information on the manufacture of Dyer's spirits.

"An A.P.S."—(1). In the prescription quoted, containing infusion of bark, the precipitate ought not to be removed.—(2). In the Pharmacopœia formula for oxymel, there can be no doubt of the fact that the strong acetic acid is ordered, producing a compound much too strong for use without dilution. We believe the preparation was not intended to be so strong.

"℥j."—Prior to the introduction of Tinct. Iodinii Comp. into the Pharmacopœia, Magendie's formula was generally employed (Iodinii, gr. 40, sp. vini R ℥j). This is also identical with the Dublin formula. The Edinburgh College orders only 30 grains of iodine to an ounce of spirit. When *tinctura iodinii* is ordered in London, it is probable that in most cases Magendie's formula may be intended, as this was in use for many years.

O.—(1). Mr. Battley's formula for liq. opii sed. has not been published. —(2). Asafœtida, if dried by heat and powdered, would lose some of its medicinal properties.

"A Learner."—Acidum sulphuricum aromat. is sometimes coloured with red sanders, for sale by retail as elixir of vitriol; but this is not the preparation of the Pharmacopœia.

F. R.—(1.) Medicinal plants cultivated in gardens are generally found to be less active than those which grow in the wild state.—(2.) No.

A. B. C.—*Lindley's Introduction to Botany*, and *Lindley's Elements of Botany*.

H. P. N. (Sheffield) wishes for a *cheap* formula for making Tinct. lupuli from the extract, for a public institution which will not give the price for a genuine tincture! [Our Correspondent should consult the managers of the institution, representing the state of the case, and if they still refuse to give a fair price, he should inquire how they would wish to have the article adulterated.]

S.—Castor oil is bleached by exposure to light.

"℥j."—The term *Aqua Ammoniæ* is synonymous with *Liquor Ammoniæ*. "Spirit of Sal Ammoniac" is generally considered to be synonymous with *Liquor Ammoniæ Sesquicarb.*

℥ij. Effervescing Lemon Kali—See vol. iii., page 116.

Y. Z.—It is the intention of the Council to offer a prize for competition to the students of the Botanical Class. The particulars will be stated to the class by the Professor.

S. S. P.—(1.) The hydrocyanic acid of Scheele contains 5 per cent. of real acid, that of the Pharmacopœia 2 per cent.—(2.) In making an almond emulsion, the sediment should be separated by straining.

"An Associate" (Norwich).—We are not acquainted with any work on cupping or dental surgery which would supersede the necessity of proper instruction and practice.

A.P.S. (Canterbury) has heard that there is a good opening for a Chemist in Rome, and wishes for further information before starting.

H. R., "A Member," and several Correspondents, are referred to the leading article of this number, also to page 43.

"Socius."—We defer the communication in order to add a few remarks which are not ready.

"A Constant Reader" should apply to the Secretary.

Erratum.—In our last number, page 597, Ginger Beer Powders, *for* Sodæ Sesquicarb. ℥ij, *read* ℈ij.

COVERS AND PORTFOLIOS FOR THE JOURNAL.

Covers for the uniform binding of the several volumes of this Journal, in cloth lettered, and also Portfolios to contain the current numbers for the year, may be had of the Publisher, Mr. Churchill.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street (before the 20th, if answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. II.—AUGUST 1st, 1844.

PHARMACEUTICAL EDUCATION.

When the Council of the Pharmaceutical Society undertook to lay the foundation of a system of education for the future members of their body, they were fully sensible of the difficulty and intricacy of the task. Had they been armed with the sanction of an Act of Parliament, and empowered to enforce a compliance with such regulations as appeared desirable, it would have been comparatively easy to bring their plans to a speedy and successful completion.

But the chief difficulty consisted in inducing a body of men hitherto uncontrolled, and averse to any kind of restraint, voluntarily to submit to a revolution for which they were not prepared, and to exert themselves in providing for their successors facilities of improvement which they had not themselves enjoyed, and which might, therefore, to many of them appear unnecessary. It was also difficult to excite in the minds of the young men a proper sense of the importance of the projected reformation; and the undertaking being altogether voluntary, general support and co-operation could not be expected in the first instance. Under these circumstances, it would have been injudicious, as well as fruitless, to embark at once upon a complete and enlarged plan; to enjoin to the full extent such regulations as may eventually be considered essential; and to discourage those who might be disposed to come forward, by laying before them a very formidable and expensive course of study.

However comprehensive and perfect might have been the courses of lectures—however eminent the professors—however admirable the arrangements for the accommodation of pupils in every

department of pharmaceutical education, these preparations must inevitably have been unavailing, unless a demand existed among the parties for whose benefit they were made.

It was therefore the first aim of the Council to create among the Associates of the Society a desire for improvement; to excite an interest in the study of their profession; and in proportion as the appetite for knowledge increased, to provide a more substantial repast.

The School of Pharmacy in London opened with a very short and elementary course of lectures on each of the branches of education which it embraced. The terms were purposely fixed in the first instance at a rate much below that which is charged at any of the medical schools, and the lectures were delivered at an hour at which it was supposed that the Associates could most easily be spared from their other duties.

The occasional evening lectures and pharmaceutical meetings, the reports of which were circulated with other information monthly among all who belonged to the Society, were also calculated to promote a general interest in pharmaceutical science; and the Professors ably seconded the efforts of the Council by pointing out to the pupils, in the most forcible manner, the absolute necessity of cultivating an acquaintance with those branches of knowledge which are essential to the safe and successful performance of the duties of the Pharmaceutical Chemist.

In the second season the courses of Lectures were enlarged, a more complete supply of apparatus and diagrams was provided, the Museum was furnished with whatever specimens were wanting to make it all that was required for the illustration of the lectures, many additions were made to the Library, and a room was fitted up with the usual implements of a Laboratory on a small scale. The advantage of these arrangements was appreciated by a considerable number of students in London, and the periodical reports of the success of the parent establishment, gave rise to the formation of several branch schools in the country.

Thus far the work had proceeded as fast and as favourably as

could have been expected ; but there was one very weighty matter which remained to be accomplished. The lectures, which had been arranged as much as possible to suit the convenience of young men in situations, were not calculated to employ the whole time of those who might be disposed to devote themselves for a certain period entirely to study. It was never supposed that by merely attending two or three courses of lectures, a student could become fully qualified as a Pharmaceutical Chemist, still less was it expected that these lectures could be made *generally* available to young men whose time was occupied in performing the duties of Assistants. One of the most important arrangements to which we have always looked forward, consists in the establishment of a practical course of instruction in the Laboratory of the Society, in which students may profitably spend several hours of the day in scientific researches. Thus, during a certain number of months prior to passing their examinations, they would devote their whole time to study ; the several courses of Lectures, the Library, and the Laboratory, affording ample scope for their exertion.

In a pamphlet issued by the editor, in June 1841, the following paragraph occurs:—"The construction of a laboratory on the most approved principles, containing all the needful apparatus, will afford facilities for practical researches which are likely to promote the great object which we have in view. Lectures on pharmaceutical operations may be instituted, and pupils in this department may "walk the laboratory," as medical students "walk the hospitals."

This, then, was one of the objects originally contemplated in the establishment of a system of pharmaceutical education, and it has been alluded to on several occasions in the *Pharmaceutical Journal*, as an essential part of the plan which is in progress. But it was a measure which, although primary in importance, was of necessity secondary in the order of its accomplishment. It was policy to test the zeal of the students by more limited courses of lectures, and to prepare them gradually for the transition, before plunging into the serious responsibility of founding a complete and extensive

laboratory, which, if not well supported, would bring discredit on the Society.

A construction of this description, if inconsiderately commenced, might have involved a double expense, in the event of circumstances rendering it desirable to remove from the premises in which it had been made, and this casualty, among others, was not overlooked. About two years ago, a plan was submitted to the Council, by which it was proposed to construct a Laboratory and Lecture-room on the basement of the house in Bloomsbury Square. This plan, after mature deliberation, was abandoned as being premature, and it was resolved to defer the formation of a laboratory for the present.

Several applications having recently been made by young men who are desirous of becoming practical pupils at the institution, the subject has again claimed the serious attention of the Council, and arrangements have been adopted which will afford the requisite accommodation. The particulars and regulations will be found on the cover of this number, but we here allude incidentally to the fact, for the purpose of completing our account of the progressive steps which have been taken; and showing, that from the commencement of the educational arrangements, until the present time, the plans originally projected have been kept in view, and have steadily proceeded as fast as circumstances would permit.

We regret to observe, that some of our members, who have not taken the trouble to assist in these operations or even to ascertain what has been done, appear to be dissatisfied; and instead of coming forward openly, stating their objections, and giving the benefit of their friendly aid, write anonymous letters, full of complaints, which are entirely without foundation. We have occasionally received letters of this description, and have seen others in print, containing a mixture of severe criticisms and judicious remarks, and recommending measures which the Council are actually endeavouring to accomplish, while the writers are evidently labouring under the belief, that the course which they propose is diametrically opposed to the policy and principles which regulate the management of the Society.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

[In reporting the Anniversary of the Society, in the number for June, the names of the Members of Council and Auditors, elected for the present year, were accidentally omitted: which omission had not been observed until our last number had gone to press. The list is therefore subjoined.]

President.....Mr. John Savory.
Vice-President.....Mr. T. N. R. Morson.
Treasurer.....Mr. R. H. Pigeon.

THE OTHER MEMBERS OF COUNCIL.

Bell, Jacob, 338, Oxford Street
Foulger, Samuel, 133, Ratcliffe Highway
Gifford, Joseph, 104, Strand
Glaisyer, Thomas, 12, North Street, Brighton
Hallows, William Ayscough, 2, Clark's Place, Islington
Hanbury, Daniel Bell, Plough Court, Lombard Street
Herring, Thomas, 40, Aldersgate Street
Horner, Edward, 20, Bucklersbury
Ince, William, 31, Southampton Street, Strand
Knight, Henry, 25, College Green, Bristol
Lescher, Joseph Sidney, 60, Bartholomew Close
Payne, Charles James, 5, St. Martin's Court, Leicester Square
Squire, Peter, 277, Oxford Street
Stamper, Ralph, 140, Leadenhall Street
Terry, Stephen, 25, Milsom Street, Bath
Thompson, George, 12, Church Street, Liverpool
Watts, John, 106, Edgware Road
Waugh, George, 177, Regent Street

AUDITORS.

Hooper, William, 24, Great Russell Street, Covent Garden
M'Culloch, William, 95, Bishopsgate Street
Swire, Roger, 14, Edgware Road
Tosswill, Charles Speare, 8, Torrington Place, Torrington Square
Wyman, John, Red Cross Street

ABSTRACT OF A LECTURE
ON
CHEMISTRY AND ITS APPLICATION TO PHARMACY.

BY THOMAS GRIFFITHS, ESQ.,
Lecturer on Chemistry and Medical Physics at St. Bartholomew's Hospital.

Delivered at 17, *Bloomsbury Square, Wednesday, June* 26, 1844.

Mr. Griffiths commenced by observing, that the art of preparing those substances which operate powerfully upon animal bodies, and which, according to their different modes of exhibition, are either efficient remedies or active poisons, is purely chemical; and that the want of an acquaintance with scientific principles in the processes of pharmacy has often been productive of dangerous consequences.

So vast and so varied are the objects of experimental Chemistry that it is exceedingly difficult to furnish a concise and correct definition of the science; but for the subject of the present lecture he might state, that Chemistry is a science which teaches us that there are certain forms of matter called *Elements*, which can unite with each other to form *Compounds*, and that these compounds of *two* or *more* elements, can unite with each other to form *Complex Compounds*; the direct union of two or more elements being called a *Primary Compound*, and the union of two or more primary compounds a *Secondary Compound*.

Chemistry investigates the laws which affect, and the powers which control, these primary and secondary combinations, and determines the proportions by *weight* in which they ensue: it also discovers methods of *separating* all known compounds into their *elements*, and endeavours to apply such knowledge to useful practical purposes, in various departments of science and art. From the foregoing statement it appears that the main object of Chemistry is to ascertain the *composition*, or the *elements*, of the varied forms of matter by which we are surrounded; and accordingly the lecturer proceeded to state the sense in which the term *element* is accepted in modern science. For example, if the Chemist subject the metal *lead* to numerous trials or experiments, with the view of discovering of what things it consists, he finds that he is baffled, and can gain no information regarding the matter; accordingly he is compelled to call the metal a *Rudiment*, a *Pure* or *Simple Substance*, or an *Element*; meaning only by the term that he cannot succeed in proving it to consist of two or more substances, or, in other words, to be a compound.

If the Chemist subjects *litharge* to experiment, he soon discovers that he can determine of what things it consists, and therefore calls it, not an element, but a *compound*, a compound

of the metal *lead* and the gas *oxygen;* and to denote this discovery, he calls litharge *oxide of lead.*

Of what does *oxygen* consist, is the next question, and this cannot be answered; *oxygen* behaves like *lead* in refusing to confess its composition, and therefore is called an *element.*

The operation of discovering the elements of litharge, or of any other compound, is called *analysis;* and it is found that the elements so elicited, when presented to each other under certain conditions, will unite and form the original compound: this is called *synthesis.*

When elements elicited analytically combine synthetically, and form the original compound, the Chemist is confident of having performed his experiments with accuracy; but with regard to organic substances, Mr. Griffiths remarked, there are strange insurmountable barriers to synthetical operations.

If the Chemist take another well-known substance, viz., *white lead,* and experiment upon it, he finds that he can *analyze* it, and obtain from it *oxide of lead* and *carbonic acid;* he therefore calls *white lead* a *compound,* and denotes its constitution in precise terms as a *carbonate of oxide of lead.*

Is *carbonic acid* an element or a compound? Analysis proves it to be a compound of *oxygen* and *carbon,* and of what does *carbon* consist? The Chemist is silent, he cannot analyze carbon, and therefore must rank it with lead and oxygen as an element. It is not difficult to separate *white lead* into *oxide of lead and carbonic acid,* and in the chemical laboratory, these *compounds* are familiarly called the *proximate elements* of the white lead, because they are nearest to the hands of the operator, and they will *directly* unite to reproduce the substance, but *lead, oxygen,* and *carbon,* of which oxide of lead and carbonic acid respectively consist, require great skill for their mutual separation, and even then cannot be analysed, and are therefore called *ultimate elements,* meaning elements elicited when the analysis of white lead is carried to the utmost extent practicable in the present state of Chemistry.

By experiments of this nature, the Chemist has gained the curious and important information (slightly noticed upon the threshold of this inquiry), that not only do elements unite to form compounds, *ex. gr. lead* and *oxygen* to form *oxide of lead,* and *oxygen* and *carbon* to form *carbonic acid;* but these compounds in their turn unite and produce a complex compound called *carbonate of oxide of lead.* Such is the meaning of the terms *primary* and *secondary combination.*

In this style the lecturer proceeded to place before the Society several experiments and models illustrative of the various points under discussion. He adverted to the voluminous list of fifty-

five elements, which the Chemist is compelled to acknowledge; and stated, that by their mutual admixture and combination, they formed that endless chain of natural and artificial productions whose investigation may worthily engage the Chemist for his lifetime in active employment, useful alike to himself and his fellow-creatures.

"The beauty and the fascination of Chemistry," said Mr. Griffiths, "consist in the constant appeal to experiment, and the utter impossibility of anticipating the result of presenting different substances to each other."

The meaning of the term *Chemical affinity* was next explained, and its distinguishing feature stated to be, that substances when they combine lose their individual characters, and no means can separate them; and, although many experiments captivate by the brilliancy they display whilst affinity is proceeding, the Chemist is not satisfied until he ascertains the *definite weight* of the elements concerned, and of the compounds produced. The Chemist makes a constant appeal to the balance: all his experiments of refined research are conducted by *weight*, and he finds that 104 parts by weight of *lead* will combine with 8 parts, by weight, of *oxygen*, to constitute 112 parts, by weight, of *oxide of lead*; and further, that these 112 of *oxide of lead*, will exert affinity for 22 parts by weight of *carbonic acid*, to constitute 134 parts by weight of *carbonate of oxide of lead*. He ascertains that to constitute *carbonic acid*, 16 parts by weight of *oxygen*, exert affinity for and combine with 6 parts by weight of *carbon*. Pursuing his researches amidst the host of elements and compounds, he discovers that they all exert affinity for each other in *definite weights*, and that he has no power of forcing their affinity in any proportions that his will may suggest: hence arises the wonderful precision, the great beauty of the modern science of Chemistry, and as the greater number of powerful medicines now employed emanate from the laboratory, a correct and extensive knowledge of the laws of Chemical affinity, and of the definite weights in which it is exerted, becomes of the most vital importance in Pharmacy, for without such *certain information, founded upon experiment*, neither the preparation nor the exhibition of medicines can be successfully and safely conducted.

"These facts," continued the lecturer, "regarding the weight in which elements and compounds combine, have been most laboriously and accurately studied during the last twenty years, and they are the foundation of a magnificent doctrine, called 'The Theory of Definite Proportions,' which has the most extensive and extraordinary bearings upon every department of Chemistry and of Pharmacy."

The general law upon which this doctrine rests may be thus stated:—whatever be the proportion by weight in which one body combines with another, it preserves the same relative proportion in its combination with all other bodies.

The Chemist must fix upon *a standard*, with which to compare the other elementary and compound bodies. *Hydrogen*, the most attenuated form of all ponderable matter, being called *unity*, and from it deducing the weights of elements and their compounds, the Chemist finds that their numbers are *simple multiples* of the *standard unit*, and, therefore, *whole numbers*. Such were exhibited in the diagrams to which the lecturer referred, and he stated that they might be called *representative*, *proportional*, *equivalent*, or more concisely, *atomic* numbers; there is not the slightest mystery attached to them, as many students even tolerably well versed in Chemistry are apt to imagine—they result from experiment, and the manner of ascertaining them was fully detailed.

The term *atomic number*, meaning the *weight* of a substance which enters into combination with any other substance, referred to the standard unit of hydrogen; thus, the number of lead is 105, of oxygen 8, of oxide of lead, 112.

But in the vast circle of experimental Chemistry, it is found that substances frequently combine in more than one proportion, and when such is the case, each succeeding proportion is a simple multiple of the first; thus, the number of carbon is 6, it combines with 8 of oxygen to form 14 of *carbonic oxide*, and with *twice* 8, or 16, of oxygen to form 22 of *carbonic acid*, and such 22 of *carbonic acid* combine with 112 of *oxide of lead* to constitute 134 of *carbonate of oxide of lead.*

Many beautiful illustrations were next selected from the compounds of mercury with oxygen, chlorine, iodine, and sulphur; and of those of nitrogen with oxygen, &c. The primary union of elements, and the secondary union of compounds, in definite weights, present all those extraordinary substances which are of such surpassing importance in Pharmacy; and, in order to denote their *actual composition* with as much precision as possible the Chemist has framed a particular language, or *nomenclature*, the leading principles of which were next explained.

The meaning of the term *incompatability* was then discussed; the production of solid *precipitates* from clear solutions; a general account of the operation of *tests;* the *evolution* of nitric acid from nitrate of potash and sulphuric acid; the *production* of hydrochloric acid from chloride of sodium and sulphuric acid, was afterwards undertaken; and the strict line of distinction between *educts* and *products* was drawn and particularly insisted upon. At this stage of the lecture, the action of *oxyacids* and

hydracids upon metals and their oxides, and the production of calomel and corrosive sublimate, were explained and illustrated by experiments, and cubical models, better calculated to impress facts upon the mind than mere diagrams. All these results of the union of elements, the interchange of ultimate and proximate elements ensue, with the greatest precision, and are amenable to the theory of definite proportions: it is thus that the Pharmaceutist is enabled to obtain his medicines at all times of the *same composition*, and that the Physician is enabled to put confidence in their exhibition as remedies for disease.

Mr. Griffiths then stated the investigation of the chemical habitudes and properties of *organic* matter to be more difficult than that of *inorganic*; but still the Chemist shrinks not from the task, his duty being to ascertain the elements of the three kingdoms of nature. He finds that vegetable and animal matters all admit of analysis into *proximate* elements of the utmost utility, *ex. gr.* gum, sugar, starch, acids, gelatine, fibrin, albumen, &c.; and discovers that the *ultimate* elements of these and all other organic compounds are probably only *four* in number, viz., *carbon*, *hydrogen*, *oxygen*, and *nitrogen*—so that the diversified array of organized matter (as far as his humble knowledge goes) appears to result not from the union of a vast number of ultimate elements, but from that of the above four, in proportions only slightly varied.

All organic matter admits of ultimate analysis, but *synthesis* is out of question; present the ultimate elements to each other under every variety of circumstances—endeavour to excite their combination by the powers of light, heat, or electricity, they will not unite to produce the original organic matter from whence they were elicited.

The proximate elements which are separable from organic matter by various operations of Chemistry, are of vast importance in Pharmacy; for example, the various acids, oils, resins, &c. the vegeto-alkalies, or active principles of opium, of yellow and of pale bark, known as *morphia*, *quinia*, *cinchonia*, and their compounds with acids in definite proportions, constitute a splendid illustration of the importance of Chemistry in its application to Pharmacy. And though it be true that the amount or weight of the vegeto-alkalies educed, varies with the quality of the opium, bark, &c., yet when obtained they are of definite atomic constitution, and display their affinities with organic and inorganic acids with undeviating exactitude.

In conclusion, the lecturer adverted to the processes of crystallization, distillation, sublimation, calcination, and stated that there is scarcely a process in Pharmacy which does not depend upon Chemistry.

PHARMACEUTICAL MEETING,

JULY 10th, 1844,

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

ON IODIDE OF POTASSIUM,

WITH A NEW METHOD FOR ITS FORMATION.

BY R. PHILLIPS, JUN.

HAVING occasion to obtain some of this preparation for a chemical test, I found considerable difficulty in procuring it in a state of purity, and in order to draw the attention of the Society to the manner in which it is, I believe, generally adulterated, I shall proceed, in the first place, to notice the impurities contained in six samples procured at different Chemists. No. 1 was strongly alkaline, and contained water, iodate of potash, and a chloride of potassium or sodium. No. 2 was almost the same as No. 1, with the exception that it contained a larger quantity of iodate. No. 3, slightly alkaline, no water, but a trace of an iodate and a chloride. No. 4 as No. 1. No. 5: this sample was almost pure, containing only a trace of an iodate and water. No. 6 as No. 1. In drawing your attention to these facts, I hope I shall not be considered as desirous of throwing the blame on the Chemists—it principally rests with the manufacturer, although at the same time I must consider it to be the duty of every Chemist to ascertain the purity of so important a medicine. The tests are extremely simple. The notes of the Pharmacopœia furnish methods for the detection of water, potash, and carbonate of potash. For the detection of a chloride, it is stated ten grains of iodide of potassium ought to decompose 10.24 of nitrate of silver, and if more than this be required, it is owing to the presence of a chloride. This process is, however, rather tedious and unsatisfactory; a better one is to decompose the iodide with nitrate of silver, to wash the precipitate well with distilled water, and then digest it with a strong solution of ammonia. If the filtered solution, acidified with nitric acid, gives a white precipitate, it is chloride of silver, and denotes the presence of a chloride of potassium or sodium. In testing for iodate of potash, some of the sample to be examined is to be dissolved in cold distilled water, the solution is to be acidulated with tartaric acid, and a solution of starch added. If the mixed solutions do not become of a dark colour, no iodate is present. It may, perhaps, also be as well to mention that the salt, if pure, is but slightly deliquescent.

The process generally made use of for the manufacture of iodide of potassium, is, I believe, to take a strong solution of caustic potash, and after adding the requisite quantity of iodine, to boil them down to dryness, and to fuse the salt in order to decompose the iodate of potash formed. This process is open to many

objections. The potash is always added in excess on account of the difficulty of taking definite quantities of it, and in some experiments I have made, I have found that it is impossible so to completely fuse the salt as to decompose the iodate of potash without rendering some of the iodide of potassium volatile by the heat employed.

The Pharmacopœia process answers well if great care is taken. By it an iodide of iron is first formed, which is decomposed by carbonate of potash, a mixture of carbonate and protoxide of iron remaining insoluble, and an iodide of potassium in solution. The principal objections to this process are, that in order to get rid of all iron it is necessary to have an excess of carbonate of potash, and there being always a slight trace of iodate of potash present.

Another method is by boiling lime with iodine, thus forming an iodate of lime and an iodide of calcium, fusing the mixture to decompose the iodate, and then precipitating the lime by means of carbonate of potash, a carbonate of lime and an iodide of potassium being formed. In trying this process, it occurred to me that if I could add a body which would decompose the iodate of lime, the trouble and loss of fusion would be avoided, and this body I found in the protoxide of iron. It is easily prepared by precipitation with the alkalies from the protosulphate of iron. The precipitate must be washed by decantation, on account of its being rapidly converted into the peroxide, if exposed to the air until the solution gives no precipitate with chloride of barium. By this process the iodate was decomposed, its oxygen uniting with the protoxide of iron to form peroxide; it was, however, so mixed with carbonate of lime, as to be valueless. I found that on mixing the iodine directly with the carbonate of potash, the latter was converted into iodide of potassium and iodate of potash. The following is a diagram of the decomposition that ensues, except that potash is substituted for carbonate of potash, as the carbonic acid is expelled.

1 atom of Iodate of Potash.

1 atom of Iodic Acid. 1 Potash.

5 atoms of Potash { 5 Oxygen, 5 Potassium } Iodine 1, Iodine 5 } 6 atoms of Iodine.

5 atoms of Iodide of Potassium.

The protoxide of iron was then added, when the iodate of potash, in the same manner as the iodate of lime, was decomposed, with the following changes :—

12 atoms of Peroxide of Iron.

1 atom of Iodate of Potash { 6 Oxygen, 1 Potassium, 1 Iodine } 12 Oxygen, 12 Iron } 12 atoms of Protoxide of Iron. 1 atom of Iodide of Potassium.

Peroxide of iron being a sesquioxide, that is to say, containing one atom and a half of oxygen combined with one of

the metal, it is necessary, in order that the whole of the iodate be decomposed, that for every atom of carbonate of potash used, there should be two present of protoxide of iron. The quantities, therefore, to be taken, are two atoms or 280 parts of protosulphate of iron, which are to be decomposed into two atoms of protoxide, one atom or 125 parts of iodine, and one atom or 83.5 parts of carbonate of potash, P. L. On account, however, of the liability of the protoxide of iron to become peroxide, it is better to take rather more of the protosulphate.

The protoxide, when washed, is to be mixed with the iodine and carbonate of potash, the proportion of water employed being half a pint to one ounce of iodine. The mixture is at first to be gradually heated, and then boiled for half an hour. The solution afterwards ought to be exactly neutral to slightly reddened litmus paper; if iodine be found in excess, which may be proved by the addition of a solution of starch to a little of it, more of the carbonate of potash must be added; if, on the contrary, it be alkaline, more of protoxide of iron and iodine.

The sesquioxide of iron remaining after being washed until the liquor gives, when acidulated with nitric acid, no blue colour if solution of starch be added, may be heated red hot for a few minutes, a beautifully pure preparation remains, which, on account of its easy solubility in hydrochloric acid, might be used with much advantage in the preparation of the tincture of the sesquichloride of iron. I have several times mentioned a solution of starch: it may be as well to observe, that it requires a temperature of about 170° to dissolve this substance.

Craig's Court, June 25th, 1844.

EXPERIMENTS ON SENNA.

BY MR. H. DEANE.

The experiments which form the subject of the present paper, were undertaken with the view of determining the best method of extracting the active soluble principles from senna, so as to found thereon a good formula for a concentrated infusion, and also of ascertaining the relative quantities of extract contained in infusions of different densities, prepared from several kinds of senna.

The following were the kinds of senna employed: 1st, fine picked Alexandrian; 2d, small Alexandrian, as usually met with; 3d, the same fanned, to separate the stalks, stones, &c.; 4th, fine Tinnevelly; 5th, common East Indian.

Three sets of experiments were made. In the first, the proportions of the ingredients were calculated to produce an infusion eight times the strength, — in the second and third only four times the strength of infusion of senna of the London Pharmacopœia.

In the first and second sets of experiments, the senna was exhausted by means of a mixture of one part of rectified spirit and five parts of water. In the third set, water alone was used, and a fifth part of spirit afterwards added to the infusion.

In every instance the specific gravity was taken with a 1000-grain bottle; and the quantity of dry extract placed against the specific gravity in the tables, is the quantity contained in the bottleful of fluid at the density specified.

The extracts were dried on a sand-bath until they were hard enough to resist any impression from the finger-nail.

The following were the formulæ adopted:—

FIRST SET OF EXPERIMENTS.

A. Senna 15 oz. troy weight.
Diluted spirit (1 part spirit to 5 parts water) 20 fl.oz.
Macerate forty-eight hours with frequent and forcible stirring in a covered vessel; then press off, and to the pressed leaves add another 20 fl.oz. of the diluted spirit; macerate as before twelve hours, and again press.

1. Take note of quantity and sp. grav. of 1st pressing.
2. Ditto ditto 2d ditto
3. When the liquors have become clear by subsidence. add to the liquor first pressed off as much of the second as will make it measure 19 fl.oz.; evaporate the remainder down to 1 fl.oz. and add it to the former, that the whole may measure 20 fl oz. This liquor will then bear a relation to the infusion of the London Pharmacopœia of 1 part to 8 parts, *i. e.* supposing the senna to be exhausted.
4. Note the produce and its sp. grav., and the quantity of dry extract it contains.

B. Dry the exhausted leaves, and note their loss by the process.

C. Infuse 15 drs. of the leaves B in 20 fl. oz. of boiling distilled water for two hours, and strain.

1. Note its sp. grav. and the quantity of dry extract it contains.

D. Infuse 15 drs. of the leaves B in 20 fl.oz. of cold distilled water for twenty hours, and strain.

1. Note its sp. grav. and the quantity of dry extract it contains.

SECOND SET OF EXPERIMENTS.

A. Senna $7\frac{1}{2}$ oz. troy weight.
Diluted spirit (1 part spirit to 5 parts water) 20 fl.oz.

Formula in other respects the same as in first set of experiments. The product in this case is intended to be four times the strength of the infusion of senna of the London Pharmacopœia.

THIRD SET OF EXPERIMENTS.

A. Senna leaves $7\frac{1}{2}$ oz. troy.
Cold distilled water 20 fl.oz.
Macerate twenty-four hours with frequent and forcible stirring in a covered vessel; then press off, and to the pressed leaves add another 20 fl.oz. of water, macerate six hours, and again press.

1. Note quantity and sp. grav. of 1st pressing.
2. Ditto ditto 2d ditto.
3. To the first pressing add $3\frac{1}{3}$ fl oz. of Rect. Sp. Wine ($\frac{1}{6}$th part of 20 fl oz.), evaporate the second to such a quantity that, when added to the other, the whole shall measure 20 fl.oz.
4. Note the sp. grav. and quantity of dry extract it contains. Remainder of the process as in the previous sets.

TABLE I.—First Set of Experiments.

	A.							B.	C.		D.	
	1. 1st Pressing.		2. 2d Pressing.		3. Produce.		4. Extract contained in Produce.	Leaves lost by the Process.	1. Hot Infusion.	2. Extract contained therein.	1. Cold Infusion.	2. Extract contained therein.
	Fl. oz.	Sp. grav.	Fl. oz.	Sp. grav.	Fl. oz.	Sp. grav.		Oz.	Sp. grav.		Sp. grav.	
1. Small Alexandrian Senna as usually found in commerce.....	9½	1.055	21½	1.012	20	1.0454	1045.4 grs. contain 144.5 grs.	4¼	1.006	1006 grs. contain 11.3 grs.	1.0057	1005.7 grs. contain 10.9 grs.
2. Fine picked Alexandrian Senna	10	1.0721	21	1.0145	20	1.0595	1059.5 grs. contain 183.7 grs.	5½	1.009	1009 grs. contain 17 grs.	1.0086	1008.6 grs. contain 16 grs.

TABLE II.—Second Set of Experiments.

3. Small Alexandrian Senna, as usually found in commerce.....	15	1.023	19	0.994	20	1.023	1023 grs. contain 87 grs.	2⅝	1.0045	1004.5 grs. contain 6.5 grs.	1.0038	1003.8 grs. contain 5 grs.
4. Fine picked Alexandrian Senna	16½	1.033	20	0.9942	20	1.0325	1032 grs. contain 106 grs.	3	1.0053	1005.3 grs. contain 8.7 grs.	1.0045	1004.5 grs. contain 8 grs.
5. Fine Tinnevelly Senna	17	1.0315	20	0.993	20	1.032		3⅛	1.0039	1003.9 grs. contain 6.9 grs.	1.003	1003 grs. contain 4.2 grs.
6. Common East India Senna	17	1.024	20	0.9926	20	1.0265	1026.5 grs. contain 99 grs.	2½	1.0044	1004.4 grs. contain 7.7 grs.	1.0035	1003.5 grs. contain 5.4 grs.

TABLE III.—Third Set of Experiments.

	A.							B.	C.		D.	
	1. 1st Pressing.		2. 2d Pressing.		3. Produce.		4. Extract contained in Produce.	Leaves lost by the Process.	1. Hot Infusion.	2. Extract contained therein.	1. Cold Infusion.	2. Extract contained therein.
	Fl. oz.	Sp. grav.	Fl. oz.	Sp. grav.	Fl. oz.	Sp. grav.		Oz.	Sp. grav.		Sp. grav.	
7. Small Alexandrian Senna, fanned	14	1.051	19	1.016	20	1.0298	1029.8 grs. contain 108.2 grs.	2¾	1.0042	1004.2 grs. contain 7.1 grs.	1.0034	1003.4 grs. contain 6 grs.
8. Fine picked Alexandrian Senna	14½	1.054	20	1.0155	20	1.0309	1030.9 grs. contain 109 grs.	3	1.005	1005 grs. contain 8 grs.	1.004	1004 grs. contain 6 grs.
9. Fine Tinnevelly Senna	16½	1.053	20	1.0115	20	1.0308	1030.8 grs. contain 109.7 grs.	3	1.0034	1033.4 grs. contain 4.8 grs.	1.0028	1002.8 grs. contain 3.4 grs.
10. Common East India Senna	16½	1.0478	20	1.0114	20	1.0276	1027 6 grs contain 96.7 grs.	3	1.036	1003.6 grs. contain 4.7 grs.	1.003	1003 grs. contain 3.6 grs.

In the third table, the senna having been macerated in pure water, the columns A 1 and 2, can only be compared with each other in that table; but the produce A 3, containing the same quantity of spirit of wine as was employed in those of table 2, may be compared with the latter.

It is obvious, a given quantity of water be put on a substance for infusion, that when the infusion is complete, and no evaporation has taken place during the maceration, there must still be the original quantity of water, *plus* the matter dissolved out of the substance infused. Yet when the strongest pressure is applied, a portion remains that no pressure will remove, but which may be removed by a further infusion in a fresh portion of fluid.

In the first series of experiments, the second infusion, *A* 2, did not bring up the results, *A* 3, to the same density or strength as the portions first pressed off, *A* 1; consequently the quantity of fluid employed was not adequate to the purpose of exhaustion. A further confirmation of this may be seen by a reference to the specific gravity of the infusions *C* and *D* in the same table, where the infusion of the leaves supposed to be exhausted, in hot and cold water, exhibits a considerable density as compared with the corresponding products described in the subsequent tables.

It was with much difficulty the first twenty fluidounces of the liquid employed could be made to perfectly penetrate the leaves in either case recorded. On repeating the experiments, the whole results were uniformly the same, and this formula was abandoned as inadequate to the purpose.

The second table exhibits a much more satisfactory appearance. In these experiments, only half the quantity of senna was employed, equivalent to double the quantity of fluid, and the exhaustion appears to have been sufficiently complete.

It will be observed, that the effect of the process has been remarkably uniform in every instance; it is therefore fair to conclude, the comparison to be drawn between the three processes must be just, and, indeed, the tables show what we should expect would be the result.

In the table No 2, looking at the density of the produce *A* 3, the order of precedence stands, first, picked Alexandrian; secondly, Tinnevelly; thirdly, common East Indian; lastly, small Alexandrian. In *A* 4, the quantity of dry extract contained in a given quantity of the fluid leads to the same conclusion.

A reference to the columns *A* 4, in the tables 2 and 3, shows that either water or the diluted spirit may be employed with much the same success; judging by the density of the produce, there is a slight difference in favour of the latter. There is also a further difference, in that the preparation with the diluted spirit has a better appearance and flavour than that made with water; the latter is more opaque, and smells spirituous; whereas the other is perfectly transparent, and smells vinous.

The specimens of senna employed in the above experiments were taken without reference to their hygrometric moisture, being in the state in which they are usually met with in commerce.

On examining three samples of senna kept in the same situation, and during the prevalence of showery weather, $7\frac{1}{2}$ oz. Apothecaries' weight of each lost, by drying on a steam-pan, as follows: Picked Alexandrian, $8\frac{2}{3}$ drs.; Tinnevelly, $6\frac{1}{2}$ drs.; Common East Indian, $7\frac{2}{3}$ drs.

In table 3, No. 7, the small senna employed was fanned before using, and, by this process, one-third of its weight was separated, as stones, stalks, and argel; and so much of the latter, as to lead to the supposition that it might possibly be introduced as an adulteration in the broken state to avoid detection. After these matters have been separated, the produce exhibits a density little inferior to that of the best picked senna, No. 8. In table 4, where the simple infusions are set down for comparison, the difference is equally marked. From this it is quite evident that small senna, in its crude state, is not fit for medicinal purposes, but, if used in medicine, should be freed from its impurities; it is then equal to the finest whole leaves.

Throughout the whole of the experiments, the liquor first pressed from the leaves soon cleared by subsidence. Not so the second, which would not clear in many days. On a microscopical examination, the cause of the opacity was found to be a multitude of exceedingly minute crystalline bodies, the raphides of the leaves. On heating this thick infusion, the coagulated albumen entangled the raphides with it, and left the liquor quite clear.

The above experiments lead to the conclusion that the formula first tried is not capable of exhausting the leaves, but that the second is perfectly so, and that if evaporation in the preparation of concentrated infusions is to be avoided as injurious, it is better adapted to the purpose. The third formula is objectionable, inasmuch as the result obtained from it is both thick and less pleasant, and not so easily prepared, because in warm weather the number of hours the water is necessarily in contact with the leaves, induces an incipient state of decomposition, that is avoided by the use of spirit.

It results from the foregoing—

That Alexandrian senna of the best quality is superior to all the others for the quantity of extract it contains, and is therefore to be preferred.

That the small Alexandrian senna, siftings of the bales, should never be used without the impurities being separated.

That of the East Indian, the large variety (Tinnevelly) is best, but neither is so full of extractive as the Alexandrian, and not possessing the same fragrance; is not to be preferred to it, but the common variety is better than small Alexandrian in its crude state.

The following table affords a view of the comparative strength of infusions of senna made with hot and cold water, and the quantities

of extract contained in them, from which it appears that cold water extracts the soluble and active portion nearly, if not quite as well as hot water.

TABLE IV.

	HOT INFUSION.		COLD INFUSION.	
	Sp. Grav.	Grains of Dry Extract.	Sp. Grav.	Grains of Dry Extract.
1. Picked Alexandrian Senna	1.017	36.6	1.017	37.1
2. Small ditto, as No. 3, Second Series	1.0143	30.	1.013	28.5
3. Ditto fanned, as No. 7, Third Series.....	1.016	33.7	1.015	31.1
4. Fannings of ditto	1.0114	26.5	1.0109	24.9
5. Tinnevelly Senna	1.0155	31.8	1.0158	31.1
6. East Indian Senna	1.0135	29	1.0138	28.7
7. Leaves exhausted by displacement	1.0025	3.5	1.0025	3.3

This table confirms the opinion above stated as to the comparative value of the different kinds of senna, with reference to the extract yielded by them.

The small senna of commerce is the siftings of the Alexandrian, and contains about one-third of its weight of stalks, stones, and argel-leaves, frequently more, which must of course lessen its efficacy as a medicine.

The infusion No. 2 was made with such, and the result shows its inferiority. No. 3 was the same small senna fanned, and although one-third of its weight was removed as impurities, it still retained a considerable quantity of argel; the weight of the infusion shows a decided improvement over the former.

No. 4, made with the fannings or refuse of No. 2, shows by its low specific gravity the cause of the inferior weight of the latter; the mean of No. 3 and No. 4 being about the same as No. 2. Nos. 2 and 4 very soon become mouldy, particularly the latter.

Is it not probable that the quantity of argel contained in Alexandrian senna may in some degree account for its infusion sometimes changing very speedily?

Tinnevelly senna stands next in value to the fanned small Alexandrian. The infusions of this senna were beautifully bright, but not so fragrant as that from pure Alexandrian.

The common East Indian senna seems to possess least extractive. The infusions were bright, and much darker than any of the others, and least agreeable in smell.

The two last kinds produce by far the brightest infusions both

hot and cold, but in each case the cold was not so bright as the hot, although they readily become so when heated. Moreover, they appeared to keep much better than the others.

No. 7, in the absence of any detailed experiments by displacement, shows how completely senna may be exhausted by that method: compare this with the infusions *C* and *D*, tables 1, 2, and 3.*

The following table shows the quantity of dry extract per cent. in some of the infusions of the specific gravity above mentioned:

Specific Gravity.	Dry Extract per Cent.	Specific Gravity.	Dry Extract per Cent.
1.0595	17.338	1.0135	2.861
1.0454	13.822	1.0114	2.620
1.0309	10.572	1.006	1.123
1.0298	10.506	1.0057	1.083
1.0276	9.410	1.0045	.647
1.023	8.504	1.0038	.481
1 017	3.598	1.003	.418
1.016	3.316	1.004	.597
1.0143	2.957	1.005	.796

Amidst other avocations, there is great difficulty in drying the extracts with that degree of nicety that is requisite to render them of much value in the calculation, yet to a certain extent they confirm the general conclusion; but reliance may be placed on the densities of the infusions recorded, and the general conclusions are deduced from them.

Dr. Houlton observed, that he had generally seen it stated in works on Materia Medica, that the properties of senna are injured by boiling, but that his experience had led him to a different conclusion, as he had for many years been in the habit of using a decoction of senna instead of an infusion. The decoction was boiled for about a quarter of an hour; but he never found any deterioration of its properties on this account, nor had he observed that the senna thus prepared occasioned griping more than the infusion, which had been stated to be the case. He was therefore not prepared to acquiesce in the opinion, that in pre-

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* My experiments by displacement, not having been made for comparison with the above, cannot fairly be placed by their side; the average of six experiments gives a density of 1.031 in the result, the relative strength of the infusions as compared to that of P. L. being 1 to 4. The quantity of spirit contained therein being 1 in 8 instead of 1 in 6 makes the density less; but having been subjected to evaporation *in vacuo*, by which a large proportion of matter is separated, it must necessarily be so.

paring concentrated infusion of senna much injury was sustained by boiling.

Mr. Scanlan said, that he had heard Mr. Donovan make a similar remark in his lectures on Materia Medica, some years ago.

Mr. Waugh thought it did not follow because a decoction of senna boiled for a quarter of an hour was an efficient preparation, that therefore the continued boiling necessary to effect its concentration, would be unobjectionable.

The Chairman inquired whether Dr. Houlton had tried the efficacy of the extract of senna?

Dr. Houlton replied, that he had not been in the habit of using the extract of senna, and that his remarks were not intended to imply that no injury could arise from long-continued boiling: he thought the subject worthy of further investigation.

Mr. Bell thought the experiments of Mr. Deane very interesting and useful, especially in reference to the comparative value of the different kinds of senna. These experiments tended to confirm the opinion originally entertained, that the Alexandrian variety, if uncontaminated, is decidedly superior to the other kinds, but that the serious adulteration systematically practised upon it, so far deteriorated its value, as to leave it doubtful whether in this state it was preferable to the best specimens of the East Indian. He hoped that when the Committee lately proposed by Dr. Pereira, had come into operation, means would be adopted for obtaining a supply of unadulterated Alexandrian senna. With respect to the concentrated infusion, he thought that although, according to Mr. Deane, a better result was obtained by macerating the senna in a weak spirit, this would not so closely resemble the infusion at present ordered in the Pharmacopœia, as would the other prepartion, in which only water was allowed to act upon the senna, and the spirit was afterwards added.

Mr. Scanlan then made the following observations

ON THE PRESENCE OF LEAD IN WATER CONDENSED IN LEAD PIPES.

At the last meeting of this Society, in the discussion that followed Mr. Squire's explanation of Dr. Clarke's patented mode of purifying water by means of lime, some observations were made about the presence of lead in water; and I myself mentioned the fact, to which my attention has lately been drawn, of the presence of an appreciable quantity of lead in distilled water, which had been condensed in leaden pipes, employed in a chemical factory for the purpose of evaporating certain acid and saline solutions.

This water, when cold, holds in transparent solution a quantity

of oxide of lead, that is readily made apparent when a stream of sulphuretted hydrogen is transmitted through it; and it carries along with it, as it issues from the waste-pipe nearly in the boiling state, a considerable quantity of lead, which is held in mechanical suspension, and deposits but slowly, owing to its state of aggregation.

When diffused through the water, just as it issues from the waste pipe, or when stirred up, after it has been deposited by rest, this salt of lead has the appearance of very minute crystals of a pearly lustre; but in time these crystals subside, leaving the water perfectly transparent; and the deposited salt can readily be collected in quantity sufficient for examination.

From the quantity of this lead salt collected at certain times, I was inclined to suspect that a corrosion of the lead pipes took place from leakage of some of the acid, alkaline, or saline solutions from without into the steam-pipes, whenever, by neglect of the boiler man, at night or otherwise, the steam was suffered to go down, thereby causing inward pressure upon the pipes; but upon submitting the deposited salt of lead to examination, somewhat to my surprise, seeing the temperature at which it was formed, I found it to be a carbonate; and I also found the water in which this salt had been suspended, perfectly neutral to test-paper, and free from other saline matter than lead.

Carbonate of lead, then, would appear to be formed at or above the temperature of 212°, by the action of the steam alone, as it issues from the boilers upon the interior of the lead pipes. But this steam, we know, is not simply vapour of water, for it must carry along with it a continuous stream of atmospheric air and carbonic acid, arising from the cold water with which the boilers are being continuously fed, as, from local circumstances, the hot water cannot with ease be employed for that purpose.

The water is, as I before stated, unfit for medical purposes, from this contamination, nor is it fitted for nice chemical purposes, from the same cause, although the quantity of carbonate of lead held in solution appears to be exceedingly minute, so much so, as to escape detection by any other test than sulphuretted hydrogen, unless the water be previously evaporated. The carbonate of lead does not appear to be more soluble in hot than in cold water, for the water does not deposit any of it on cooling, if filtered from the mechanically suspended carbonate as it issues from the waste pipe.

APPARATUS FOR THE GENERATION OF SULPHURETTED HYDROGEN.

I TAKE the opportunity, in connexion with this subject, as well as with one to which I shall just now allude, namely, the presence

of arsenic in our commercial sulphuric acid, and its consequent introduction into muriatic acid, to introduce to the notice of the Society a very simple and effective apparatus, of little cost, for the purpose of obtaining, at any moment, a continuous and steady stream of sulphuretted hydrogen.

It is made on the principle of Dobereiner's lamp, and consists of a common cylindrical vessel of brown stoneware, about six inches in diameter and nine deep, in which is placed an inverted funnel of the same material, within which you put a tray of nearly the same diameter, and about an inch deep. This tray must stand up about one inch from the bottom of the outer vessel, and within the funnel, in order to prevent escape of gas from expansion by change of temperature, when the generator is not in use.

To the tail of the funnel you must adapt a piece of tin gas-tube, bent once at a right angle, to the other end of which is soldered a gas-cock into which may be cemented a glass tube for immersion into the liquid to be tested. A washing-bottle may be adapted, if necessary, to prevent any sulphate of iron being carried mechanically from the generator into the liquid under examination.

Mr. Scanlan then alluded to the

PRESENCE OF ARSENIC IN SULPHURIC ACID.

Having had occasion lately to make a quantity of pure muriatic acid, I took what I then conceived to be oil of vitriol made from sulphur, for the purpose, but which I have since learned is made from pyrites.

Knowing that neither iron nor lead could be present in the acid, and not suspecting the presence of arsenic, I did not test the muriatic acid for metallic impurities at first; but upon examination subsequently, the presence of a very large quantity of arsenic was proved beyond a doubt: in fact, such a quantity as one would be surprised to find in the commonest commercial muriatic acid.

I was long ago aware of the existence of arsenic to a great extent in the sulphuric acid employed by the Lancashire and other alkali-makers in the north of England. I have seen arsenious acid in great quantity sublime in the kilns, which they employ for roasting the pyrites, and my friend Mr. Gamble, an extensive alkali-maker at St. Helens, told me that when erecting a new oil of vitriol chamber, he could not use his own vitriol to make hydrogen for Delbruck's patent blow-pipe, now in use for autogenous soldering, in consequence of the quantity of arsenic it contained. He had to get acid for this purpose from another maker who used sulphur; but I confess I did not expect to find arsenic in any appreciable quantity in the London acid.

I have obtained 1.5 grains sulphuret of arsenic from 2000 grain-measures of this acid, which is in other respects quite pure. This very large quantity arises from the employment of two atoms $\dot{S}\,H$, to decompose the salt as recommended by Dr. Gregory.

ON EXTRACT OF HEMLOCK.

BY MR. SCANLAN.

Some time ago, my friend Mr. Morson did me the favour to lay before you a specimen of extract of hemlock, in the preparation of which the albumen was separated. My attention has been lately drawn to the preparation of the green extracts, and I now wish to call the attention of this Society to their preparation.

Several years ago, in conjunction with my late partner, Mr. Hunt, of Dublin, I was in the habit of preparing annually large quantities of belladonna extract from the plant which we ourselves cultivated in the ground attached to the factory. At first we had constant complaints of our extract becoming mouldy, but ever since we adopted the plan of separating the albumen, we found this extract, as well as henbane, to keep without moulding for years. I first saw the fact noticed in *Chevallier's Pharmacy*, that the moulding of these extracts was caused by the vegetable albumen.

The mode of separating the albumen is this: You let the expressed juice of the plant operated upon stand till the chlorophyll has separated, then decant the clear liquor and heat it to about 140, when the albumen coagulates, and is very readily separated by a strainer; the filtered liquor is now evaporated, and the chlorophyll stirred in as the extract thickens. Extracts prepared in this way are much smoother than if the albumen be suffered to remain, and will keep any length of time. The amount of the albumen is so small as compared to the whole extract, that it does not materially affect the strength of the preparation. It would be well if the framers of the Pharmacopœia would direct the chlorophyll also to be separated, as it is, I believe, as well as the albumen, inactive.

In an accurate experiment I made upon the juice of conium, I found the coagulated albumen to be to the extract without the chlorophyll as one to ten, that is, a portion of juice freed completely from chlorophyll by filtration, coagulated by heat and filtered again, gave one part of albumen and ten parts of extract; and two experiments from equal quantities of expressed juice gave:

Extract free from albumen, but containing chlorophylle ...	40
Extract containing both	47

47 : 100 : : 40 : 85 or 15 per cent.

PROVINCIAL TRANSACTIONS.

At a meeting of the Bath Branch of the Pharmaceutical Society, a paper was read

ON BARBADOES NAPHTHA.

BY MR. TYLEE.

A mistake has imperceptibly crept into some of our best works on Materia Medica, on the *Petroleum Barbadense*, and I would call the attention of our excellent Society to the following true indication of the genuine characteristics of that article.

I will first refer to the directions given by Professor Faraday for distinguishing the true Barbadoes rock oil, or green mineral naphtha, from the spurious substances sold under the name of Barbadoes tar; and by following these, and making a proper use of the *seeing*, *smelling*, and tasting faculties, there will be no difficulty whatever in detecting the genuine from the adulterated. First, colour: a very distinctive character exists in the apparent colours of the true and spurious. The true has always a greenish hue given by reflected light, in addition to its brown colour (which is not so deep as the spurious); this is most evident on looking at the rock oil in contact with the side of the bottle; it varies in different positions, so as to give a degree of uncertainty to the colour, appearing sometimes as a greenish-brown. The term dusky green-brown, perhaps, conveys the best impression; but although the shade may vary, it is never absent.

The spurious preparation is browner than the true substance; and when in a bottle, has a decided and definite dark brown colour, at times appearing black, but the peculiar green reflection of light, so characteristic of the Barbadoes rock oil, never occurs in it.

The true is more fluid than the spurious; for when a bottle containing it is inclined, the contents flow immediately; whereas the spurious flows with difficulty, and is more like soft pitch; and if a bottle of each be placed upright, the true soon flows down and off the sides, while the spurious requires a long time for the purpose. The same difference in fluidity may be observed by putting a wire into the article, and if quickly taken out, not more than a fourth or fifth of the quantity of the true will adhere to it, in comparison with the spurious, when tried in the same way. If some of each sort be put upon plates of glass, and warmed, it will be found that the same difference of fluidity or

adhesion exists at a higher temperature, and may be as easily discerned.

The odour also affords a good distinction. The smell of the true is peculiar and distinct, and unlike that of any artificial product: but this can only be properly appreciated by trial. The spurious partakes very much of the smell of lampblack or printer's ink, from which the true is perfectly free; and the spurious has none whatever of that smell so peculiar to the true. When the specimens are warmed, the distinction in smell is much more evident.

The taste likewise affords another very good distinction. If a little of the spurious be rubbed on the tongue, it proves to be nearly insipid; but at length a taste like that of drying oil or printer's ink is perceived, and alternately the taste assimilates to common tar. But upon introducing a little of the true, a strong aromatic taste is quickly perceived, which remains for some time in the mouth. The true is eight or ten times more potent in affecting the tongue than the spurious. In making this sort of trial, the spurious must always be tasted first; for if the true be first applied, its taste is so strong that the spurious cannot be perceived.

The touch is another mode of detecting the difference; for when the true is tried by rubbing it between the finger, it feels smooth and oily; whereas the spurious is more adhesive and stringy.

Lastly, ether affords a distinction between the substances. If a small quantity of both, the true and spurious, be put into separate glasses, and ether poured upon each, and shaken only for a moment, so that very little may be dissolved, that portion over the true will acquire the power of exhibiting a greenish light colour, when held up and looked at; and on observing the other portion which contains the spurious, for want of this, there is so striking a difference that the two glasses cannot be easily mistaken one for the other. If the ether be afterwards made to take up much more of the substances, it will be found that the same distinction will appear in the deep-coloured solutions that were to be observed in the substances themselves, particularly that dusky greenish reflection so peculiar to the solution of the true Barbadoes rock oil.

I would now call your attention to those errors to which I have alluded.

Dr. Pereira states, in his *Materia Medica*, that Barbadoes petroleum, at ordinary temperatures, has the consistence of treacle; its colour is *reddish-brown* or *blackish;* its *odour* and *taste* are *bituminous;* it floats on water; is combustible, yielding a thick black smoke, and leaving a carbonaceous residuum: it is inso-

luble in water. By distillation, five parts by measure yield rather more than four parts of a yellow oily fluid, somewhat similar in appearance to the liquid carbohydrogen obtained in the manufacture of oil-gas, but dissimilar to naphtha. The residuum in the retort is a substance analogous to asphaltum.

On referring to Dr. Christison's Dispensatory, we find that the petroleum, Barbadoes and Trinidad, has a *jet-black colour;* a peculiar, not agreeable, bituminous odour, and the consistence of thick cream or treacle. Under exposure to air, it gradually hardens to the *consistency of pitch.* Heat increases its liquidity, but does not render it a thoroughly mobile fluid; and a higher heat expels a naphthous liquid, whose properties have not been carefully examined; acid, alkalies, and rectified spirit have little effect upon it; ether and the oils, fixed as well as volatile, dissolve it. It consists chiefly of carbon and hydrogen, with a little oxygen and nitrogen.

Lastly, in the *Pharmaceutical Journal* for July, 1843, in an article on Naphtha, it is said, "The term naphtha was originally applied to a species of hydrocarbon, of a yellowish white colour, highly volatile and combustible, which exudes from the ground in certain localities in Persia, Italy, &c. The natural naphtha is somewhat *similar* in its nature to the substance known as Barbadoes tar, which is also a compound of hydrogen and carbon, and which rises in considerable quantity in some springs of water in the island of Barbadoes. The Barbadoes tar, or petroleum, although it has sometimes been designated as naphtha, differs from the last-mentioned by being *viscid* or *nearly black.* After the adoption of the manufacture of gas from coal, it was found that the substance called Coal-tar, one of the products of this manufacture, *very closely resembled Barbadoes tar* in its physical characters; and for many years coal-tar was almost entirely substituted for, and sold under the name of Barbadoes tar.

Bath, July 9th, 1844.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE JAMAICA DOGWOOD.

BY WILLIAM HAMILTON, M.B., H.M.L.S.
(Of Plymouth).

HAVING been informed by my friend Charles Balkwill, of this town, that communications, relating to the medicinal and pharmaceutical properties of West Indian productions, would be acceptable to your journal, I avail myself of the intimation to communicate to you a few facts which fell under my own observation, during a residence of some years in the Antilles.

I first arrived in those islands in the month of March, and having in the following month of April, been invited to a fish-poisoning party, at a little bay of the island in which I resided, my attention was forcibly attracted by the powerful narcotic effects exhibited by the bark of the roots of the *Piscidia erythrina*, or *Jamaica dogwood*, upon even the larger kinds of fish; and it occurred to me, that advantage might be taken of this property to render it subservient to the purposes of medicine.

I accordingly procured a quantity of the bark, and after various trials, found that the tincture, prepared by macerating the bark of the roots gathered during the period of inflorescence, and before the appearance of the leaves (the piscidia being one of the few deciduous trees indigenous within the tropics), in four times its weight by measure of *rectified* spirit for twenty-four hours, and filtering, was the only preparation available for medicine. The tincture so prepared appeared to be fully saturated, and was of the colour and transparency of fine madeira or sherry.

Having been for some time a martyr to the tooth-ache, which had deprived me of my natural rest, I determined to make the first trial of my new medicine upon myself; and accordingly on going to bed, mixed a drachm-measure of the tincture with a rummer of cold water, and drank it off—waiting to observe its effects. Soon after receiving it into the stomach, I experienced a violent sensation of heat, which gradually increased in intensity, awakening in my mind a suspicion that the predictions of my friends, who assured me I should poison myself, were on the eve of fulfilment. However, the deed was done, and I resolved to abide the issue without flinching. The sensation of burning gradually extended itself to the surface, and while I was considering what antidote I ought to employ, a profuse diaphoresis burst out from every pore, and a sleep the most profound I ever experienced, arrested me so abruptly, that I remained motionless for the whole night, with the uncorked phial in one hand and the glass out of which I had taken the dose in the other, till

after the sun was high above the horizon on the following morning, a space of twelve good hours, when I first returned to consciousness, free from every pain or ache, and without any of those unpleasant sensations which invariably succeed to an overdose of opium.

I had certainly taken a larger dose than was, perhaps, necessary; but the result was most triumphant. I afterwards employed it with equal success, as a topical application, in a number of cases of carious teeth, introducing it on a dossil of cotton into the diseased cavity; and after a single application, I never heard of a return of pain in that tooth. Wishing to compare its powers with those of opium, I took equal measures of water, containing the animalculæ of the mosquito, and having dropped into one glass as much of the tincture of opium as was necessary to make them fall motionless to the bottom, I added an equal number of drops of the dogwood tincture to the other, with a corresponding effect. I then decanted the supernatant liquor, and washed the mass of animalculæ in each glass with fresh filtered water from the dripstone; after a few ablutions, those which had been stupified by the tincture of opium recovered, and swam about with their wonted vivacity, while all my efforts to revive those acted upon by the dogwood proved ineffectual.

Circumstances which it would be impertinent to detail, prevented my following up these experiments to a more satisfactory conclusion; but the subject will yet, I trust, be taken up *con amore* by some competent observer. I shall therefore conclude for the present with a few cautions which appear to me essential to success: First, the bark of the roots should be collected about the period of the full moon in April, at which time the tree is in full flower, or coming into flower, and the leaves have not yet unfolded. Next, that the best rectified spirit alone should be used in making the tincture—the active principle of the bark being only soluble in spirit, and precipitating on the addition of water, with which it makes a milky compound. It is possible that a longer maceration than I employed might be successful in extracting more completely the active principle; but it might be desirable to divide the tincture so obtained, keeping that made during the first twenty-four hours distinct from the second, or making a portion with twenty-four hours' maceration, and another portion with forty-eight hours' or more; and comparing, by some common test, the relative qualities of each. The following is the formula for the tincture I used:

℞ Pulveris crassi Corticis Radicis Piscidiæ Erythrinæ, ℥j.
Spiritus Vini Rectificati, fl℥iv.
Macera simul per horas viginti et quatuor in vasi aperto et cola. Dosis fl℥j. et infra ex haustu aquæ puræ.

The bark, on being chewed, gives out an unpleasant acrimony, similar to that of the mezereon; but the tincture, probably from being largely diluted with water, did not appear to me to excite the same sensation in the throat and fauces. Since my return to England, I have had a bottle of the tincture, prepared at my request for me by Menzies & Co., of Kingston, Jamaica, and sent to me by Dr. Bancroft. But upon trial, I found its effects very different from those which I recollect to have experienced from the tincture prepared by myself, at the season and with the precautions I have mentioned. Hence it is clear that these precautions should not be neglected.

Should this brief notice be favourably received, it may, perhaps, be followed by further communications on the medical properties of the West Indian Flora at future periods.

14, *Octagon, Plymouth,*
June 24, 1844.

ON THE PRESENCE OF IRON IN WATER.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

My dear Sir,—I see in the last number of your journal, M. Marchand's paper "On the Presence of Iron in River Water." I had lately some specimens of spring water sent to me in consequence of its action upon the leaden pipes by which it was conveyed directly from the spring to the house, and although the water, as is usual in such cases, was remarkable for its purity, I was surprised at finding in it very unequivocal traces of iron. In Thames water from different parts of the river (and before passing through iron pipes) there is also a notable quantity of iron, and I have since found it in all spring water which I have examined, in the London basin, and in the Hastings sand, in the district of Kent and Sussex. The matter is curious in reference to the source of the iron required for building up the animal frame, but I think it may also be of some importance as regards the preparation of some extracts and other things, in which considerable quantities of water may happen to be evaporated down to a small bulk, and where there would of course be a corresponding concentration of the proportion of iron.

I should observe that I merely test the waters I have alluded to as they came from their sources, and without condensing their saline contents by evaporation. A few drops of solution of ammonia are first added, and then a little fresh infusion of galls, for the detection of the iron; in most waters a purple or even black tint is presently perceived, in others it requires some minutes before it ensues. I have also found traces of iron in

samples of distilled water, but this arises from the vessels in which it has been kept, or from careless distillation. I merely mention this subject in case any further discussion should arise upon it at your Society. I much regret that I have lately been prevented attending any of your meetings, but hope to do so during another session.

Yours, my dear Sir, very faithfully,

Royal Institution, W. Thos. Brande.
10*th July*, 1844.

THE EFFECT OF PASSING WATER THROUGH A COPPER PIPE.

A specimen of water was recently brought to us for examination, on account of the quantity of sediment which was observed to deposit in it, and also from the party fancying that it was unwholesome. The plumber who had erected the pump through which the water passed, had, in one part of the apparatus, inserted a copper pipe, and having been accused of injuring the water by this means, brought the specimen to be examined. The deposit was found to consist chiefly of carbonate of lime, with a very appreciable quantity of copper.

PILULA IODIDI FERRI.

My dear Sir,—I promised to let you have an exceedingly simple and ingenious method of preparing pills of iodide of iron, which has been generally followed by Druggists here for eighteen months past, and which seems to me superior in facility and certainty to any other. It was communicated to me in January, 1843, by Mr. Robert Leslie, then apothecary in the Royal Infirmary of Glasgow, with permission to make it public. I ought to have done so sooner, but the delay enables me to speak with some confidence, from frequent trial, both of the great convenience of the process, and likewise of the utility of the preparation as a tonic remedy.

Take of iodine 127 grains, iron wire about the thickness of a thin quill, half-an-ounce, distilled water 75 minims. Agitate them briskly together in a strong ounce-phial, provided with a well-fitted glass stopper, until the froth which forms becomes white, which will happen in less than ten minutes. Pour the liquid upon two drachms of finely-powdered loaf-sugar in a little mortar, and triturate immediately and briskly for a few minutes; add gradually a mixture of the following powders, viz., liquorice powder half-an ounce, powder of gum Arabic a drachm and a half, and flour one drachm. Divide the mass into 144 pills.

Each pill contains about a grain of iodide of iron. The only

alteration I have made in Mr. Leslie's formula, is the substitution of coarse for fine iron wire—first, because less heat is produced; and secondly, because the resulting solution is more easily poured off.

In operations on the large scale, the bottle ought to be wrapped in a strong towel, in case of an explosion being caused by the evolution of steam from the heat produced; and even on the small scale, the stopper must be held firmly, otherwise it will probably be blown out, and the materials lost.

After all that has been recently written on the action of sugar in preventing the proto-salts of iron from alteration under exposure to the air, it is unnecessary to point out the reason why these pills keep remarkably well. With the *syrupus iodidi ferri* of the last Edinburgh Pharmacopœia, and this *pilula iodidi ferri*, it appears to me that every other pharmaceutic form of the salt may be dispensed with. I am, yours most truly,

R. Christison.

Edinburgh, 22d June, 1844.

ON PATCHOULI OR PUCHA PAT.

Under the name of *patchouli*, *patchoulie*, or *patchouly*, are imported into this country the dried foliaceous tops of a strongly odoriferous plant, called in Bengallee as well as in Hindee, *puchá pát*.

On the 27th of June last, Mr. Ellis, drug-broker, of Fenchurch Street, put up for sale, at Garraway's coffee-house, forty-six cases of this substance. Some of the packages consisted of half-boxes containing 50lbs. each; others of whole boxes holding 110lbs each. The price asked was six shillings per pound, but there were no biddings. This lot came from New York, to which place it was said to have been carried from China. On inquiry, we find that patchouli is not often imported. Nearly twenty years since, a quantity of it was imported into France from the Isle of Bourbon, and a notice of it was published by Virey in the *Journal de Pharmacie*, for February, 1826 (t. xii., p. 61).

Very little is known of the plant yielding it. About ten years ago it was introduced into the botanical garden at Calcutta from Penang, but up to April, 1841, it had never produced blossoms. (O'Shaughnessy's *Bengal Dispensatory*). Dr. Wallich (*Transactions of the Medical and Physical Society of Calcutta*) says, that it obviously belongs to the family Labiatæ, and that it has considerable affinity to the *Marrubium odoratissimum Betonicæ folio* of Burmann's *Thesaurus Zeylanicus**. "It forms a shrub

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* Virey suggested that it is the *Plectranthus graveolens* of R. Brown.

(in the botanical garden) of two or three feet in height. The obtusely four-cornered branches and the leaves are juicy and somewhat fleshy, and covered, especially the inferior surface of the latter, with a great deal of soft pallid pubescence, which gives the plant a greyish appearance. All the young parts are densely villous. The leaves are opposite, petioled, ovate, obtuse, grossly and obtusely lobato-crenate, measuring from two to four inches; the lowermost on the branches are subcordate, all the others are cuneate, and entire at the base, the upper surface slightly rugose, under surface pallid, with very thick rib and nerves, and largely reticulated veins."

The dried tops imported into England are a foot or more in length. The large stems are round and woody, and when cut transversely, show the pith surrounded with a thick layer of wood remarkable for the distinct medullary rays which it presents; the smaller branches are obscurely four-angled. The leaves agree for the most part with Dr. Wallich's description, except that I find many of them to be serrate or serrato-crenate.

The odour of the dried plant is strong and peculiar. I cannot call it agreeable, though some others do, while many persons regard it as disagreeable. It is somewhat analogous to that of *Chenopodium anthelminticum*. The taste of the dried plant is very slight.

By distillation it yields a *volatile oil*, on which the odour and remarkable properties depend. Baboo Radhakant Deb informed Dr. Wallich that this oil was in common use in India "for imparting the peculiar fragrance of the leaf to clothes among the superior classes of natives."

Mr. George Porter, late of the island of Penang, says, that "The puchá pát grows perfectly wild at Penang, and on the opposite shore of the Malay peninsula, in Wellesley province. The Arabs use and export it more than any other nation. Their annual pilgrim-ship takes up an immense quantity of the leaf. They use it principally for stuffing mattresses and pillows, and assert that it is very efficacious in preventing contagion and prolonging life. It requires no sort of preparation, being simply gathered and dried in the sun; too much drying, however, is hurtful, inasmuch as it renders the leaf liable to crumble to dust in packing and stowing on board. In Penang it sells at the rate of a dollar and a quarter to a dollar and a half per pekul*. In Bengal, some which was sent from thence several years ago, sold at eleven rupees eight annas per maund. At times the price is much higher. The last investment sold so low as six rupees only per maund. It has not been seen in flower."

* The pekul is equal to 133½lbs. *avoirdupois*.

In Europe it is principally used for perfumery purposes. *Sachets de Patchouli* are sold in the shops. They consist of a few grains of the coarsely-powdered herb mixed with cotton-wool and folded in paper. Placed in drawers, chests, &c., they are said to drive away insects from linen, shawls, &c. An *Essence de Patchouli* is used by perfumers principally for mixing with other scents in the preparation of compounded perfumes: for this purpose it is considered very useful. This, as well as the sachets, is sold by Messrs. Schooling of Barge Yard, Bucklersbury.

In India it is used as an ingredient in tobacco for smoking and for scenting the hair of women.

P.

NEW METHOD OF SILVERING GLASS.

Mr. Drayton's patented process for silvering mirrors was described by Professor Faraday, at a meeting of the Royal Institution on the 7th of June. This is effected by means of a solution of nitrate of silver with ammonia, to which is added an essential oil dissolved in spirit of wine. The oil precipitates the silver on the surface of the glass in the metallic form, and in a state of brilliancy surpassing that of an ordinary mirror. It possesses another advantage over the old method with tin and mercury, namely, that it may be readily applied to an uneven surface, as for instance, to a piece of glass cut in the form of a pattern. Bottles may be coated with silver in a few minutes in the following manner:—

In a four-ounce bottle dissolve four grains of nitrate of silver in a little distilled water, add a few drops of liquor ammoniæ, which throws down a brown precipitate: continue the addition of ammonia, drop by drop, until the precipitate is redissolved: then fill the bottle up to the shoulder with water, and add ten drops of oil of cloves, pimento, or cassia, dissolved in a drachm of spirit of wine. In a few minutes the silver will be precipitated on the inner surface of the bottle. It has occurred to us that wide-mouthed bottles thus prepared might be used for keeping powdered digitalis, conium, or other leaves, which require to be excluded from the light. It would only be necessary to wash the interior of the bottle with a little spirit of wine to dissolve out any of the oil which might adhere to it, and when dry the silver will be found to adhere to the glass as effectually as could be desired for the purpose.

It was stated by Professor Faraday that Mr. Drayton uses two oils—cassia and cloves, and finds either kind alone ineffectual; but we have succeeded in producing this result with oil of

pimento alone without difficulty, and cannot understand on what principle two oils are required. Indeed, the theory of the process has not been very satisfactorily explained; but it is supposed that the oil has the property, by its deoxidizing power, of throwing down the silver in the metallic form on the surface of clean glass, in the same manner as it is precipitated on the fibre of linen in the case of marking-ink. At the conclusion of the process, the oil appears to have been converted into a resinous substance. We may observe, that if the operation be not performed exactly in the manner above stated, the silver is not precipitated on the surface in the metallic state, and in several experiments we have seen it thrown down in the form of a black powder.

HINTS FOR PRESERVING PLANTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

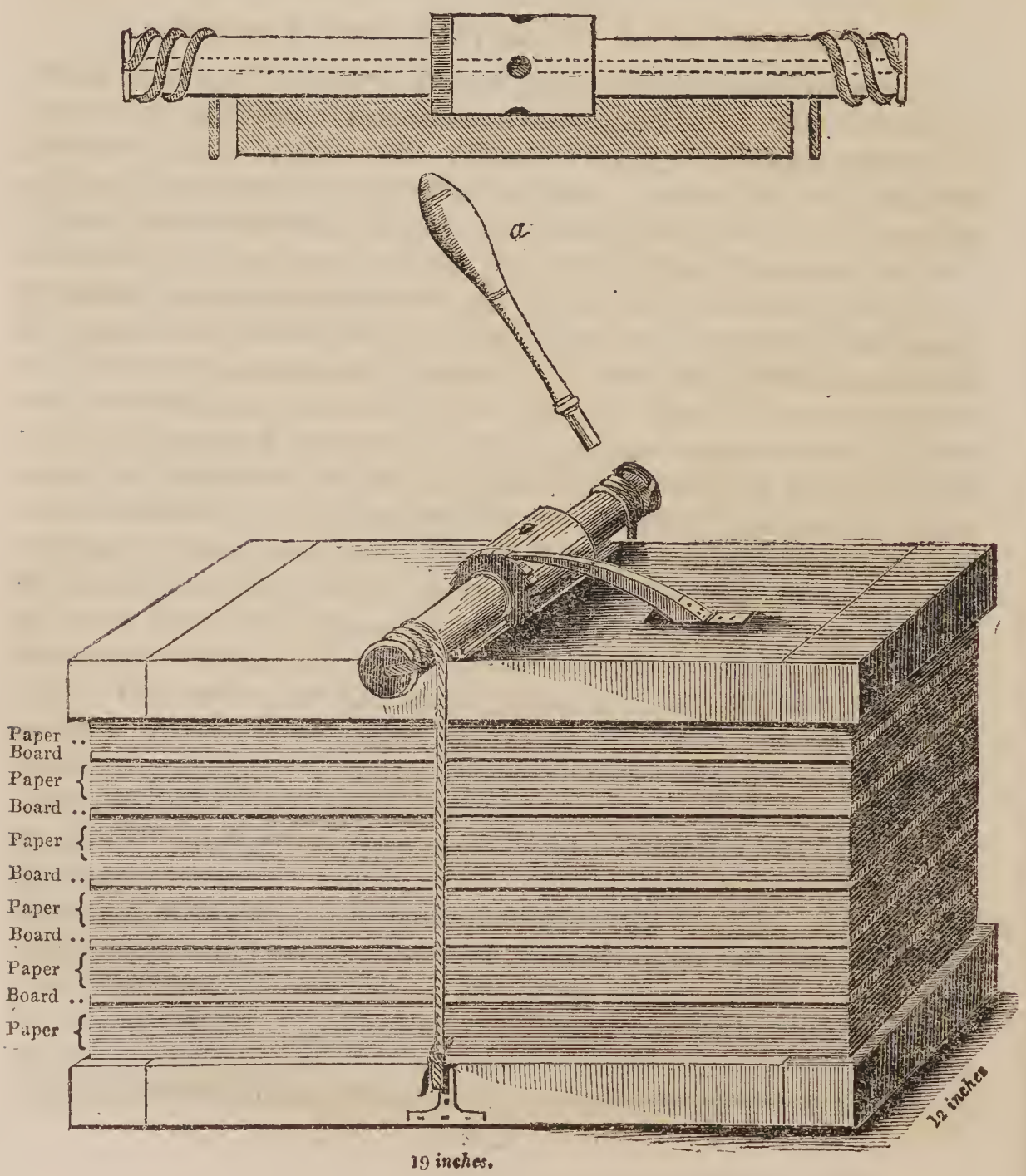
Sir,—Having been favoured with a perusal of your journal by a friend, I saw two communications on the subject of collecting and preserving plants; and following the study of botany myself, I think I might, perhaps, add a few hints to the communications referred to. I use the machine of which a drawing and description are annexed, and to me it seems the most useful apparatus for drying plants that I have seen. I employ blue and white, or blue and red papers, the use of the colours being to distinguish where specimens are placed. I commence with a layer of six or eight sheets of blue paper, then one sheet of red or white, over which the recent specimen is placed and covered with another sheet of white, then several sheets of blue, and so on. When a sufficient quantity has been built up, one of the boards heated on both sides before a fire, should be placed on the pile to serve as a base for another series of strata, which series I prepare before I place the heated board on the former, so that the plants above it have all the benefit of its heat; by interposing these heated boards at intervals, the plants dry much better and lie more flat. The lowest stratum under one of the boards may be made a store place for unmounted specimens, not that I would recommend that plan, as all should be mounted as soon as possible, but only for the accommodation of one whose time is limited. The three usual modes of drying plants for a hortus siccus are liable to objections: first, the placing them between papers with a weight on them has this inconvenience, that where you place them there they must remain, or you stand the chance of disarranging them; —the second method, namely, compressing them by means of boards and straps, has the inconvenience of throwing all the weight on the edges of the boards, and you cannot conveniently keep your

package tight; but for a person taking a journey and botanizing on the way, this mode is the most convenient;—the third method, the employment of a standing screw press, takes up much room, and having no elasticity, it will not modify the pressure to the plant, but presses unequally, and the trouble is greater in amount than in the press I have described, which is unfastened and refastened in a moment, and may be moved anywhere, being nearly as portable, as the boards and straps; and the cords render it almost as elastic as the weights and boards, &c. It is capable of effectually compressing any plant that it may be necessary to place in it.

I remain, Sir, your very obedient Servant,

WILLIAM CHRISTIE.

37, *Westmoreland Place, City Road,*
28th June, 1844.



P. S. The top and bottom boards 19 inches by 12 inches of $1\frac{1}{2}$-inch mahogany, mortise-clamped at ends, the spindle is turned in one piece, and perforated to admit of a cord being passed through it. The ends (of spindle) have rims turned on them, through which a notch is made to afford a place for the cord, which is then wound around the ends of the spindle; and its extremities being looped and put over the two hooks at bottom, the winding the cord around the spindle compresses the contents of the press. The drum has four holes in it, to admit the end of lever *a*, by which the requisite force can be applied. A brass ratchet-wheel and brass-ended stay or jigger hinged to the top, complete the machine. The boards should be $\frac{1}{2}$-inch or $\frac{5}{8}$-inch St. John's or Miramichi pine, as no turpentine exudes with the heat.

ON THE ADULTERATION OF COFFEE, AND THE MODE OF DETECTING THE FRAUD.

Roasted and ground coffee is extensively adulterated by the grinders and retailers of this substance; and the public, we suspect, is scarcely aware of the great extent to which the practice is carried. We propose, therefore, in the present article, to point out the substances used for this purpose, and the mode of detecting them.

The principal adulterating ingredient is *chicory*. This is the dried, roasted, and ground root of a syngenesious plant, called by botanists *Cichorium Intybus;* better known, probably, to most of our readers by its English appellation of *wild succory*.

Two kinds of chicory are sold by dealers, the foreign and the British. *Foreign chicory* is the produce of Prussia, Belgium, and France, but is roasted and ground in this country. It is the most esteemed. *British chicory* is the growth of this country, but the roots produced in England are more woody and less fleshy than those which are imported. They yield, when roasted and ground, a chicory powder, which has a paler colour than the foreign, and a more speckled appearance. Hence British chicory is of inferior value, and is usually coloured with *Venetian red.**

But while the grocers, on the one hand, cheat their customers by adulterating coffee with chicory, the chicory-dealers in turn cheat the grocers by adulterating chicory. The substances employed in effecting the latter fraud are principally *Hambro' powder* and *coffee-flights*.

Hambro' powder consists of roasted and ground peas, &c., coloured with Venetian red. The term *coffee-flights* is applied to the thin membranous coat (endocarp) which separates from the coffee-seed in the act of roasting.

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* *Venetian red* is the sesquioxide of iron (obtained by calcining copperas), adulterated to suit the various prices of the market.

Having now explained the nature of the substances employed in adulterating coffee, we proceed to point out a ready mode of detecting *chicorized coffee* from *genuine coffee;* premising, that by "chicorized coffee" we mean not only coffee which has been adulterated with genuine chicory (foreign or British), but also that which is mixed with *spurious chicory*, viz., Hambro' powder.

If a little *genuine ground coffee* be thrown on a wineglassful of cold water, it for the most part floats, becomes very slowly moistened, even when shaken up with the water, and communicates scarcely any colour to the liquid. Very gradually it imbibes water, the liquid acquires a very pale sherry tint, and at the end of several hours the greater part of the powder is found to have fallen to the bottom of the glass.

If *powdered chicory* be treated in the same way, the phenomena are very different. It very speedily absorbs moisture, communicates a deep reddish-brown tint to the water, and in a few minutes falls to the bottom of the liquid. *Foreign chicory* yields a strong, dark, blood-red tint to the water. *British chicory, coloured with Venetian red*, gives a less deep, but rather more brown colour. *Hambro' powder* communicates a somewhat weaker colour than the last, but the tint is of the same kind. Owing to the presence of torrefied starch in Hambro' powder, the water, to which the latter has been added, acquires a deep *purplish* colour on the addition of a solution of iodine; whereas the water to which either coffee or chicory (British or foreign) has been added, merely acquires a deeper reddish-brown tint, when a solution of iodine is mixed with it.

These differences in the action of water on coffee and chicory furnish us with a means of detecting chicory in ground coffee. Throw about a teaspoonful of the suspected coffee on a wineglassful of water, and stir the mixture with a spoon. If the coffee be pure, the phenomena will be as above described for genuine ground coffee. If, however, it be *chicorized*, the presence of chicory (genuine or spurious) will be readily detected by a portion of the suspected powder rapidly sinking, and communicating to the liquid a reddish-brown tint, which will be more or less deep according to the amount of chicory present. If the coffee be adulterated with Hambro' powder or roasted corn, we have a farther test in iodine, which communicates a purplish or bluish-red tint to the water to which either of these substances has been added.

The preceding test is sufficiently delicate and valuable, in all ordinary cases, for detecting chicory in coffee; but to those familiar with microscopic investigations, the microscope furnishes another mode of proceeding, fragments of dotted ducts being found in chicory, but not in pure coffee. They are not met with, however, in great abundance; and some patience and care,

therefore, are requisite in searching for them. The starch grains of Hambro' powder are readily detected by the microscope, as also the blackening effect of a solution of iodine on them.

There is another substance which is sold for mixing with coffee, under the name of *refining powder*. It is a dark rusty-brown powder, intermixed with glistening scales. Its odour is that of caramel or burnt sugar, its taste is bitterish. Heated on the point of a knife over a candle or lamp, it fuses, swells up, evolves an inflammable gas, and leaves a coal which by incineration yields a whitish ash. Thrown on water, it almost immediately sinks, and communicates a dark red colour to the liquid; and by these characters it may be detected in coffee. It appears to owe its most remarkable qualities to partially charred saccharine matter. A decoction of it when cold is unaffected by iodine, showing the absence of starch. It is bought by the keepers of coffee-shops principally. Half a teaspoonful is sufficient for a quart of coffee. By means of it the beverage is said to be of equal strength with a much less consumption of coffee. It is sold in tin boxes, on which the name and address of the manufacturer are stamped.

P.

ON THE GREEN TEAS OF COMMERCE.

BY ROBERT WARINGTON, ESQ.

[*Concluded from our last, page* 37.]

In Dr. Horsfield's valuable translation * on the subject of the manufacture of tea in Java, we find, at page 36, the following dialogue :

"*Visitor.* Is it indeed the case that tea is so much adulterated in *China?*

"*Superintendent.* Unquestionably! but not in the interior provinces, for there exist rigid laws against the adulteration of tea; and all teas, as they come out of the plantations, are examined on the part of government, to determine whether they are genuine; but in Canton, which is the emporium of teas, and especially at Honân, many sorts—indeed most teas—are greatly adulterated, and that with ingredients injurious to health, especially if too much of these ingredients be added. This is especially the case with the *green* tea, in order to improve the colour; and in this manner to add to the value of tea in the eyes of the common consumers.

"*Visitor.* Are these ingredients known?

"*Superintendent.* Most of them are certainly known; they have been communicated to government (we presume the Dutch government), while at the same time the privilege has been requested that they might not be employed here; and although this occasions loss, the request has been granted; and it has been ordered by government that not the least admixture should take place, either to improve the colour or taste of the tea, even in such cases where this might be desirable."

Dr. Royle states †, "The Chinese in the neighbourhood of Canton are able to prepare a tea which can be coloured and made up to imitate various qua-

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* *Essay on the Cultivation and Manufacture of Tea in Java*, translated from the Dutch by Thomas Horsfield, M.D., F.R.S.

† Article "Thea," in the *Penny Cyclopædia.*

lities of green tea; and large quantities are thus yearly made up." And Dr. Dickson *: "The Chinese annually dry many millions of pounds of the leaves of different plants to mingle with the genuine, as those of the ash, plum, &c.; so that all spurious leaves found in parcels of bad tea must not be supposed to be introduced into them by dealers in this country. While the tea trade was entirely in the hands of the East India Company, few of these adulterated teas were shipped for this country, as experienced and competent inspectors were kept at Canton, to prevent the exportation of such in the Company's ships; but since the trade has been opened, all kinds find a ready outlet, and as the demand often exceeds the supply, a manufactured article is furnished to the rival crews."

During these investigations I have received samples of teas, both green and black, imported into this country from China, which are known by the most experienced brokers not to contain a single leaf of tea, and which were sold at public sale in bond at from 1¾*d.* to 2*d.* per pound.

Again: "The green tea for exportation undergoes some process which changes its colour, giving it a bluish green hue."

Mr. Davis † gives the following important information on this subject:— "The tea farmers ‡, who are small proprietors or cultivators, give the tea a rough preparation, and then take it to the contractors, whose business it is to adapt its further preparation to the existing nature of the demand."

"Young hyson §, until spoiled by the large demand of the Americans, was a delicate genuine leaf. As it could not be fairly produced in any large quantities, the call for it on the part of the Americans was answered by cutting up and sifting *other* green teas through sieves of a certain size; and as the Company's inspectors detected the imposture, it formed no portion of their London importations. But the abuse became still worse of late, for the coarsest *black* tea leaves have been cut up, and then *coloured* with a preparation resembling the hue of green teas." At page 466 Mr. Davis continues, after speaking of the frauds with spurious and adulterated teas which the Chinese had endeavoured to practise: "But this was nothing in comparison with the effrontery which the Chinese displayed in carrying on an extensive manufactory of *green teas* from *damaged black leaves*, at a village or suburb called Honân.

"The remission of the tea duties in the United States occasioned, in the years 1832 and 1833, a demand for green teas at Canton which could not be supplied by the arrivals from the provinces. The Americans, however, were obliged to sail with cargoes of green teas within the favourable season; they were determined to have these teas, and the Chinese were determined they should be supplied. Certain rumours being afloat concerning the manufacture of green tea from old black leaves, the writer of this became curious to ascertain the truth, and with some difficulty persuaded a Hong merchant to conduct him, accompanied by one of the inspectors, to the place where the operation was carried on. Entering one of these laboratories of fictitious hyson, the party were witnesses to a strange scene." The damaged black tea leaves, after being dried, were transferred to a cast-iron pan placed over a furnace, and stirred rapidly with the hand, "a small quantity of turmeric in powder having been previously introduced; this gave the leaves a yellowish or orange tinge, but they were still to be made green. For this purpose some lumps of a fine blue were produced, together with a substance in powder, which, from the names given to them by the workmen, as well as their appearance, were known at once to be *Prussian blue* and *gypsum*. These were triturated finely together with a small pestle, in such proportions as reduced the dark colour of the blue to a light shade; and a quantity equal to a teaspoonful of the

* Article "Thea, Medical and Dietetical," *Penny Cyclopædia.*
† Davis's *Chinese.* ‡ Vol. ii., p. 458. § P. 464.

powder being added to the yellowish leaves, these were stirred as before over the fire, until the tea had taken the fine bloom colour of hyson, with very much the *same scent.* To prevent all possibility of error regarding the substances employed, samples of them were carried away from the place. The Chinese seemed quite conscious of the real character of the occupation in which they were engaged, for on attempting to enter several other places where the same process was going on, the doors were speedily closed upon the party. Indeed, had it not been for the influence of the Hongist who conducted them, there would have been little chance of their seeing as much as they did *. It is an interesting and important question to determine whether the same system of artificial colouring enters at all into the manufacture of the more genuine green teas brought to this country. One fact is well ascertained and undeniable, that the Chinese themselves do not consume those kinds of green teas which are prepared for exportation †. The young hyson and Pekoe teas, made from the green-tea plant, have a yellower and, as it were, a more *natural* hue than the bluish green that distinguishes the elaborated teas imported to us."

Mr. Bruce states ‡, that in the last operation for colouring the green teas, "a mixture of sulphate of lime and indigo, very finely pulverized and sifted through fine muslin, in the proportion of three of the former to one of the latter, is added to a pan of tea containing about seven pounds, about half a teaspoonful of this mixture is put, and rubbed and rolled along with the tea in the pan for about an hour. The above mixture is merely to give it a uniform colour and appearance. The indigo gives it the colour, and the sulphate of lime fixes it. The Chinese call the former *Youngtin*, the latter *Acco*."

Indigo, however, as previously stated, has never yet been met with on any of the green teas of commerce that have fallen under my notice.

The following curious observation occurs in M'Culloch's *Commercial Dictionary :* "Blue is a favourite colour with the Chinese; and, in 1810-11, the imports of Prussian blue into Canton from England amounted to 253,200 pounds. But for some years past the Chinese have not imported a single pound weight. The cause of the cessation of the trade deserves to be mentioned. A common Chinese sailor, who came to England in an East Indiaman, having frequented a manufactory where the drug was prepared, learned the art of making it, and on his return to China he established a similar work there with such success, that the whole empire is now supplied with native Prussian blue."—*Proceedings of the Chemical Society.*

ON THE DIFFERENT KINDS OF FECULA.

BY SCHLEIDEN§.

It is a well-known fact, that we have not yet progressed in our knowledge of the structure of starch, beyond the information afforded us by the investigations of Fritsche : the following communication, therefore, on this subject may not be wholly unacceptable.

* Davis's *Chinese*, Vol. ii., p. 468. † P. 469.

‡ *Report on the Manufacture of Tea, and on the Extent and Produce of the Tea Plantations in Assam*, by Mr. C. A. Bruce, Superintendent of Tea Culture, presented to the Tea Committee, August 16, 1839.

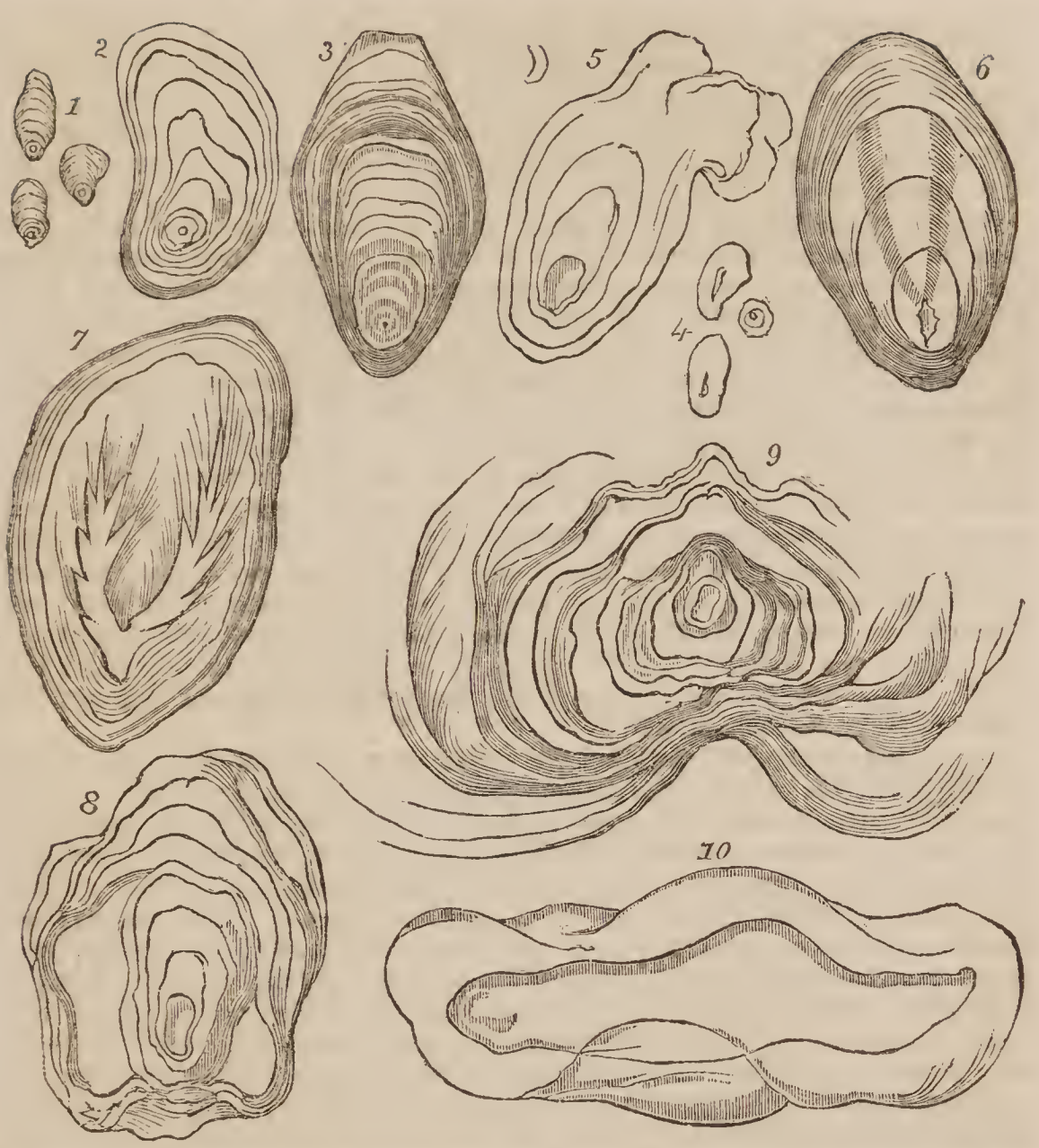
§ This paper is the conclusion of a very excellent treatise on the value of microscopic examination generally. The author recommends especially Körner's pocket microscope ; it consists of four double lenses, constructed in the manner of the ordinary small microscope, and magnifies from fifteen to one hundred times the diameter. It is adapted for all entomological, pharmacognostic, and botanic purposes, and even for anatomical research, and costs less than £3, and is made with great care and accuracy.

A. *Potato starch.*—The common potato-starch of commerce is a somewhat coarse shining white powder, with an admixture of larger portions. Rubbed between the fingers, it may be reduced to a fine powder, feels rather hard to the touch, and is rather gritty between the teeth. If it be moistened, it forms larger masses, which remain adherent when dried, without crumbling. If this starch be perfectly purified by long washing with cold water, alcohol, and ether, it presents itself as an extremely fine white glistening powder, which, when moistened and dried, no longer adheres in lumps. It requires a tolerably long time to free this starch from all impurities and extraneous substances, and the fluids used for this purpose show for some time traces of albuminous and fatty matter. The different opinions respecting the chemical relations of starch appear to depend on the circumstance of the experiments having been conducted with impure starch, and never with a perfectly pure specimen.

The separate particles or grains of starch appear under the magnifying microscope (with a power of 100 times in diameter the size of the object) as small, firm, always ovoid bodies (*see* fig. 1). Deviations from this form are comparatively very rare. In starch recently obtained from potatoes a small dark point is most clearly observed at the apex of each grain: this is the *nucleus of Fritsche.* Very rarely, and only by a much higher magnifying power, this point is observed in the potato as a small spot (*Fleckchen*) filled with so thin a substance that it appears to be a foramen or aperture (*Loch*), or rather a small hole or cavity (*Hohle*) in the denser mass. Much more apparent is this phenomenon in the starch of the bulbs of certain Liliaceæ, and the certainty of its existence will be confirmed by a comparison of various other sorts of starch. A number of lines of a paler or darker colour surround, sometimes nearer, sometimes more remotely, this so-called nucleus, at first in circles, but subsequently assuming an ovate arrangement, including the nucleus in their ellipsis as the centre or focus. The substance contained between these lines appears of a lighter or darker colour, and in certain places remarkably bright (fig. 2), so that an experienced microscopic observer soon recognises layers varying in density to be before him, and knows that the outer layers, in general, are denser than the more internal layers, which in fresh starch seem to be almost gelatinous. In no single grain do these dark lines intersect the line of the periphery, and however close to each other they may be arranged at the apex, each line remains perfect in itself. If a grain on which the lines are not distinctly marked, be turned over under the microscope*, the lines will be observed to hold the same relation to each other on all sides, and to surround the nucleus in the same manner. Hence we may conclude that the lines are not mere marks or configurations on the surface, but the points of contact of many hollow ovoid capsules, of which the whole grain is composed.

Sometimes we may succeed, by making a section of a very amylaceous potato with a very sharp razor, in dividing some of the starch grains through their centre; and then the microscope will prove the arrangement to be such as we have described, and the inner layers to be more watery and gelatinous, whilst the outer contain less water, and are firmer. Perfectly dried grains present a less number of lines, which are frequently, however, more strongly defined, and a broad dark line may frequently be observed to correspond with a layer of air (fig 3). If starch be allowed to lie for a certain time in gum-water, these lines gradually disappear; and if the gum be then dried until it forms a viscid mass, which may be cut with a knife, a number of sections and small discs may be obtained, cut from one and the same globule. In the latter a homogeneous substance may be observed, having in the centre a rather irregular small cavity, caused of course by the desiccation of the internal watery layers (fig. 4).

* This may be easily effected by adding a drop of water, which forms a stream.



On adding sulphuric acid to starch, under the microscope a variety of phenomena will be observed, and as the acid is stronger or weaker, so will be the rapidity of its action on the organic matter. If the acid be concentrated, the grain, is immediately affected by it at the point of contact, swells up like a cloud, and is gradually dissolved; and this alteration progresses slowly from the one extremity of the grain to the other. Thus grains may be observed to be perfectly liquified at the one extremity, whilst their outline is well defined at the other, and the nucleus with the layers are yet to be distinguished. The whole substance of the grain is uniformly acted upon, and there is not found any bursting of the external layers, and escape of the fluid contents (fig. 5). Where the action of the acid is less rapid, two different modes of dissolution will be equally often observed, probably dependent on the different degrees of concentration of the acid. In very dilute acid the grain becomes gradually transparent, gelatinous, and swells, but in a peculiar manner; so that it presents at first on the one side an impression, and gradually assumes a cup shape (by swelling less at the impressed point than at the margins); and is, lastly, gradually dissolved—the dissolution proceeding from the periphery towards the centre. The second form of slow action of the probably yet very concentrated acid, consists in the conversion of the so-called nucleus into a very evident air-vesicle, which expands and presents one or two serrated lacerations in the

interior of the grain proceeding from the vesicle (figs. 6 and 7); the grain gradually swells, becomes gelatinous, the lines disappear from the point of contact with the laceration, and the whole grain becomes, lastly, invisible [is dissolved]. The proximate action of the sulphuric acid seems, in this case, to consist in the abstraction of water from the inner layers. The action of heat on the grains would rather corroborate this hypothesis.

Potato-starch heated on a tin plate until the smaller portion which is in immediate contact with the tin has assumed a yellow colour, exhibits under the microscope every possible degree of gradual change, which is in this case very remarkable, and affords the best demonstration of the structure of the starch grains. The first action of heat is of course exsiccation, by which the so-called nucleus is converted into an air-vesicle, which is so characteristic, that by this appearance alone we may always detect whether due heat has been applied to the starch, *e. g.* to the *Mandiocca farinha**, to *sago*, &c. (fig 27.) As a consequence of the desiccation, the layers at the same time separate; the lines of separation become more strongly defined, darker and broader, and may be plainly recognised as consisting of broader or narrower layers of air; at certain spots the layers are more, at others, less firmly connected; and then they form larger spaces filled with air. These layers then gradually peel off, like the layers of an onion, and at certain points the substance *melts*, properly speaking (or is converted into gum). Figs. 8 and 9 show some of the characteristic steps of this gradual alteration of a starch-grain:

If we observe the various stages of action of water heated gradually to the boiling-point on starch, we shall at first remark a change similar to that described as produced by sulphuric acid. In the latter stages the appearance differs, inasmuch as the rent or laceration in the centre or interior gradually forms a large excavation, and the whole swelled grain then appears like a shrivelled sack with very thick parieties (fig 10). The outlines now become gradually less distinct, but the pasty mass formed by each separate grain, remains distinct by itself without mixing with the contiguous grains. And if we examine by the microscope the thin boiled paste mixed with water, iodine will always demonstrate the separate grains, whilst the water which has been added does not acquire a blue colour. The starch was, indeed not boiled for several successive days, but it is my opinion that it will absorb a large quantity of water, and thus swell to a considerable bulk (although this swelling seems to have its limits), but that it is never absolutely soluble in either cold or boiling water.

Starch rubbed down with double its volume of cold water in a mortar, yields a viscid, glutinous, almost stiff, unctuous mass. If examined microscopically, it then appears that the grains have been broken up, torn, and compressed in various ways, and partly rubbed into flocculi; but the inner layers, those containing more water, appear to be more especially pressed out, and to have attracted by the friction an additional proportion of water, and form a fine flocculent or granular, but adherent mass, to which iodine imparts a blue colour, whilst all the surrounding fluid (the *water*) remains perfectly uncoloured.

All these experiments were conducted with different varieties of (impure) potato-starch of commerce, but each variety was subjected to every one of these experiments, and gave the same result in all essential particulars. Iodine was used in every experiment, and on no occasion was there the remotest reason for believing that any portion of the grains is not uniformly acted upon by this reagent. On no occasion was it necessary in these experiments to have recourse to any other hypothesis than to that which is

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* *Mandiocca farinha* is better known in English commerce by the name of *Tapioca meal*.—Ed. *Pharm. Journal.*

so readily proved as a fact, *viz.*, that the layers of the grains of starch contain more water in proportion with their proximity to the centre. Traces of albumen, fat, or wax may perhaps be adherent or admixed, but they are not essential. The slight variations in the intensity and rapidity of the action of the reagents on the external layers, may be in this way explained. To regulate this variation, experiments were also made with perfectly pure starch.

B. *On the presence of starch, and the forms in which it is met with in the vegetable kingdom.*

1. Amorphous Starch.—This has been found (as a paste) by Schleiden in the cells of two phanerogamic plants only, *viz.*, in Cardamom seeds always, and in the bark of Jamaica Sarsaparilla. It is probable that the starch which is generally present in all varieties of the latter plant, is altered in the process of drying by heat, to which the sarsaparilla is subjected. It is mostly observed in the red root, which varies much in colour, less frequently in the yellow variety ; both, however, are yet classed in commerce as varieties of Jamaica sarsaparilla.

II. Simple Grains.—In most plants the grains are quite simple (single or separated) ; double or triple grains are occasionally met with mixed with these, but they constitute exceptions to the general rule.

They may be subdivided into the following groups :—

(I.) *Roundish grains.*

A. Where the central excavation (*nucleus* of *Fritsche*) appears to be quite wanting.

1. Very small, nearly globular grains are met with nearly throughout the vegetable kingdom.

B. With a small roundish central hole.

a. With distinct laminated structure.

2. Very massive, rough, and often deformed grains met with in the *Cycadeæ*.
3. Ovoid grains : in *Potatoes* (figs. 11 and 12 *).
4. Conchiform, or shell-shaped (*muschelförmige*) in the larger *Liliaceæ*, viz., *Fritillaria*, *Lilium* (fig. 13).

b. With indistinct or no lamellated structure.

5. Rounded polyhedral grains : in *Zea Mays* (fig. 14).
6. Very small polyhedral grains, with sharp angles : in *Oryza sativa*.

C. With longish central aperture.

7. Roundish or ovoid grains, exhibiting generally, in the dried state, a stellated laceration in the internal layers : in *Leguminosæ;* viz. *Pisum Phaseolus* (figs. 15 and 16).

D. Quite hollow, apparently cup-shaped grains.

8. Very marked in the rhizome of the *Iris florentina*, and the allied species (fig. 17).

(II.) *Flattened* (flachgedrückte) *or Lentiform grains.*

9. Sometimes with, sometimes without, a distinctly laminated structure, with central or eccentric, with small roundish or longish, or sometimes with a stellated and lacerated hole : in *Triticum*, *Hordeum*, and *Secale* (fig. 18).

(III.) *Quite flat discs.*

10. With distinct laminæ, but it is yet doubtful whether they completely envelope each other, or are meniscuses simply laid one above the other. Analogy, and the appearances produced by exposure to dry heat and by dissolution in sulphuric acid, are in favour of the former hypothesis.

* Fig. 11 shows a potato-cell with its grains ; fig. 12, the isolated cell of a soft boiled potato.

Not in all the *Scitamineæ*, as Meyen states, but exclusively in the *Zingiberaceæ* (of Lindley) ; neither in the *Cannaceæ*, nor in the *Marantaceæ* (fig. 19).

(IV.) *Staff-shaped* (stabförmige) *corpuscles.*

11. With longish central aperture ; in the milky juice of the indigenous and of some tropical *Euphorbias* (fig. 20).

(V.) *Quite irregular bodies.*

12. In the milky juice of many tropical *Euphorbias* (fig. 21).

III. Compound Grains.—Simple grains are found with these, in plants or in a part of a plant, but as exceptions only.

(I.) The separate grains without distinct central hole.

13. Arranged after the most simple type, in groups of two, three, or four grains : in the *Marantaceæ*, viz., *Aponogeton* and *Marattia* (fig. 22).

14. In groups of two or six, in general regularly arranged, rarely irregularly : in all varieties of Sarsaparilla (fig. 23).

(II.) The separate globules in this composition, with distinct central hole.

a. All the separate grains of nearly equal size.

15. In groups of two or four united after simple types. Central hole small and roundish : as in *Manjoc.*

16. In groups of two or four united after simple types. Central hole large, exceedingly elegant, with stellated laceration : in *Colchicum autumnale* (fig. 24).

17. The groups of two or four united after simple types, the single globules hollow and apparently cup-shaped. This form is marked in *Radix Iwarancusæ* (*Anatherum Iwarancusæ* (fig. 25).

18. United in very irregular groups of 2—12. In the tuber of *Arum maculatum* (fig. 26).

b. To one larger grain several smaller granules are grown together.

19. In *Sagus Rumphii*, &c., and in Sago generally (fig. 27).

All the forms above mentioned may be distinctly recognised with the magnifying power of 100 times the diameter contained in Körner's microscope, and the figures are delineated as they appeared with that power. The practical utility of microscopic examination of starch will be self-evident, inasmuch as the various forms of starch may be readily recognised, and thus any admixture or adulteration may be easily detected. Thus it will only be possible to adulterate West Indian arrow-root with the starch of plants, which are too rare to be used for that purpose ; and whose fecula has the same properties as that of *Maranta arundinacea*. East Indian arrow-root cannot possibly be mistaken for or adulterated with any kind of starch, excepting with the varieties of starch of the *Zingiberaceæ* generally, which are probably all identical, but could not be gained with advantage from any other plants of this family, as the well-known species of *Curcuma* —(*Archiven de Pharmacie*, xxxvii., pp. 300—310.) *Pharmaceutiches Central Blatt*, June 19, 1844.

EXPLOSIONS IN THE MANUFACTURE OF POTASSIUM.

BY WÖHLER.

All persons engaged in the manufacture of potassium are aware of the violent explosions resulting on moistening the black substance which is formed with the potassium. The danger attending the examination of this singular substance, is shown by the following observation :—The gas was conducted by a glass tube four feet in length, and half an inch in diameter, from the potassium receiver into a dry vessel, in order to condense the solid matter passing off with the potassium, which it deposits in the form of a loose greenish gray powder, becoming red on exposure to the air. When the tube became filled, it was taken off, and hermetically sealed at both ends. In this state it remained for ten days, when the contents were evacuated into a porcelain cup. The mass instantly assumed a purple colour, and in a few moments spontaneously exploded with a violent report, shattering the cup.—*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

ON BUTYRIC ETHER.

BY WÖHLER.

This substance, which emits a fragrant odour of apples, is said to be much used in the manufacture of rum. For technical purposes it may be readily obtained, dissolved in spirit, by saponifying butter with potash ; dissolving the soap, by the aid of heat, in the smallest possible quantity of pure alcohol; and to this solution adding a mixture of alcohol and sulphuric acid, until the solution has a strong acid reaction, and subjecting it to distillation until the fluid which passes over ceases to emit a fruity odour.

By repeated distillation, and treating with chloride of calcium, the pure ether may be separated.

According to an analysis by Borntraeger it consists of—

	Found.	*Calculated.* $C_{12}\ H_{12}\ O_4$.
Carbon.....	61.57	..... 62.35
Hydrogen	10.91	..... 10.25
Oxygen	27.52	..... 27.40

Caproic ether contains, according to Lerch, nearly 67 per cent. of carbon. —*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

QUICK METHOD OF MAKING MERCURIAL OINTMENT.

BY HENSLER.

Hensler recommends ℥vj of metallic mercury, ℥ij of mutton suet, and ℥v of hog's lard, to be rubbed down on a flat iron slab, adding occasionally ℥j of sulphuric ether at each time, until the metal is totally killed. The whole labour occupies about three-quarters of an hour, and the consumption of ether amounts to about ℥vij.—*Pharmaceutisches Central Blatt*, 8 May, 1844, No. 19.

REVIEW.

Chemistry, *as exemplifying the Wisdom and Beneficence of God.* By George Fownes, Ph. D. *London: John Churchill, Princes Street.*

We have already alluded, in a previous number (vol. iii, page 554), to the circumstances which have led to the publication of this volume. Stamped with the approbation of the judges by whom the Acton Prize was awarded, Mr. Fownes's essay is now submitted to the ordeal of public opinion.

The object and general arrangement of the work are thus described by the author:—

"The recent discoveries of Chemistry, more especially in its relations to animal and vegetable physiology, lead to the hope that it may be possible to draw an inference of design from the chemical constitution of the earth and its inhabitants, hardly inferior in value to that derived from their physical study—although not always so obvious and striking. The following pages contain an attempt of the kind.

"The subject will be discussed in the following order:—

"*The chemical history of the earth and the atmosphere.*

"*The peculiarities which characterize organic substances generally.*

"*The composition and sustenance of plants.*

"*The relations existing between plants and animals.*

"*Appendix.*

The work is written in an easy and unaffected style, and technical language is entirely avoided. Indeed, so completely has the author divested himself of the dry severity of scientific phraseology, that he occasionally gives a poetical turn to his descriptions, as, for example, in the following paragraph:—

"Who does not inhale with rapture the perfumes of a flower-garden, when the dews of night or the refreshing summer shower have awakened the thousand sweet odours of its fair inhabitants! The breath of the hawthorn and of the rose have been always one of the most favourite themes of the poet's song; they have ever been associated with the purest and sweetest imaginings of tenderness and affection; and yet this endless succession of pure and simple pleasures is but a mere consequence of the law which bids a vapour, arising by its own elasticity from a volatile substance, mingle itself with the surrounding air, and extend its influence until its effects become so enfeebled by dilution as to be imperceptible to the sense."

Throughout this little volume we observe an excellent example set to writers of this class of works, by the avoidance of expres-

sions which might prove offensive to any readers; thus rendering the work acceptable to persons of all religious denominations, who will read with equal pleasure and advantage this little Treatise on some of the general principles of Chemical Science.

ADMISSION OF MEMBERS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

London, July 4th, 1844.

Sir,—I have observed Mr. M'Culloch's letter in the *Pharmaceutical Journal* for this month, stating, that "a general dissatisfaction appears to exist, from the circumstance of the Members in the Country paying the same subscription as those in London, who derive nearly all the advantages of the Association." I fully agree with the remarks you make upon the subject; for though I am a Town Member, and residing a very little distance from the institution, I have never availed myself of the privilege of attending it; for the information I should there acquire, only at the sacrifice of much time, I obtain through the medium of the Journal. I feel truly thankful to those gentlemen who devote so much time and labour for the general benefit of the trade; and am assured, that, indirectly, I am receiving great advantage from being connected with the institution.

While writing, I am desirous of making a suggestion, seeing that you contemplate a general reduction in the subscription; that is, when it takes place, whether it would not be expedient to give those Chemists, who have not joined the Society, another *limited* opportunity of doing so without *fine or examination*. There were very many, I am assured, who held back from an impression that the professed objects of the Society would never be realized; and others, feeling that the amount of subscription was too large. I submit this would bring a vast number of new members to join the Society: strengthening it on the one hand, and on the other raising the funds, which would be seriously diminished from any considerable reduction in the amount of subscription.

I am, Sir,

Your obedient Servant,

A Town Member.

[The admission of Members having been alluded to, we take this opportunity of correcting a mistake which has found its way into the *Medico-Chirurgical Review* of July. It was stated in a lecture on Pharmacy, published in the *Lancet* of May 18th, that the Council had conveyed "a false impression," by "studiously holding out an expectation, that Members of

this Society only would be held legally qualified to pursue Pharmacy, whilst persons who should not become Members would lose this important privilege."

We had not intended to notice this statement, supposing that its inaccuracy was sufficiently obvious; but seeing it quoted in *Dr. Johnson's Review*, with some editorial remarks in extenuation of the alleged policy of the Council, we think it right to contradict the assertion altogether; and we defy any person to produce a passage in the published Transactions of the Society, or circulars issued by the Council, justifying such an allegation.

The originators of the Society called upon all their brethren to unite in an undertaking, the nature of which was fully explained. It was always stated, that "the success of the undertaking would depend upon the zeal and number of its supporters,"—that the advantages to be derived from it would be prospective—that the natural result of an improvement in the qualifications of the Members would be the enjoyment of such privileges and protection as their merit might entitle them to claim—and that to participate in these advantages it would be necessary, and no more than fair, to participate also in the labour and expense of obtaining them. But it was always stated, that no Act of Parliament could be obtained which would have a retrospective operation—that the Society could exercise no control over persons *already in business*, who did not belong it, excepting that of exclusion from any privileges or distinction which such an Association might confer on its Members.—Ed.]

TO CORRESPONDENTS.

"A Correspondent" (M.D.), suggests, in reference to an "Associate, Norwich," last month, that we might recommend Bell's *Anatomy, Physiology, and Diseases of the Teeth*, 8vo, 14*s*., and Bayfield *On Cupping*, 8vo, 5*s*.; which books are exceedingly good, although they will not supersede practice.

"Chelsea."—(1.) See the above.—(2.) Iodide of copper may be made by a process similar to that given in the Pharmacopœia for iodide of iron, substituting copper for iron.

"Effervescing Lemonade," made without a machine.—Mr. Bartlett has sent us the following:

℞ Sodæ Sesquicarb. ℈ij.
Sacchari. Albi. ʒij.
Ess. Limonis. gtt. iv.
Aquæ Fontan. Oss. Misce.
dein Adde Acidi. Tartarici *Cryst.* ʒj.

Cork the bottle and tie it down directly. As soon as the acid is dissolved, the lemonade is ready for use.

"A Learner."—Liquor Potassæ, "On dilute nitric acid being added, but very few or no bubbles of carbonic acid are given out."—P.L.—(2.) Yes, by ordering them of any bookseller.—(3.) See the above.—(4.) Steggall's *First Lines for Chemists and Druggists* is 3*s*. 6*d*.

"Earnest."—Tallow oil is separated from tallow by forcible pressure.

A. B. (Liverpool) ℞ Lin. Hydrarg.
Lin. Saponis, aa ℥ss.
Tinct. Colchici, ℥iv. M. ft. linimentum.
The above could not be mixed so as to form a uniform compound, and A. B. did right in respectfully stating the fact to the prescriber.

"Novitius." A.P.S.—(1.) ℞ Ol. Olivæ, ℥ij.; Aquæ calcis, ℥vi. M. The above ingredients will not combine to form a good liniment.—(2.) Mr. Battley makes a preparation called liquor cinchonæ.—(3.) Elements of Algebra, by the Rev. T. G. Hall.—(4.) Edwards's Greek Grammar, and Valpy's Delectus, published by Parker, West Strand.

A.P.S. (Staines) ℞ Decoct. Diosmæ, lbj.
Sp. Æth. nit, ℥ss. M.
There is no authorized formula for decoct. diosmæ. The proportions ordered in the Pharmacopœia for the infusion might be used, but the less it is boiled the better. Its properties are diuretic, tonic, and sudorific. See Phillips's *Translation of the Pharmacopœia.*

"An Apprentice."—Syrup of poppies contains no opium.—(2.) See vol. iii, page 455.

"An Associate."—Liq. plumbi diacetatis should be sent out clear.

"A Member."—(1.) The leaf sent to us is that of Verbascum *Thapsus*, great mullein, or high taper. The seeds of the plant are said to be poisonous to fish.—(2.) Lindley's *Synopsis of the British Flora*, 10*s.* 6*d.*

"A Brother Chip."—Concentrated infusions will not keep with less than a fourth part of rectified spirit, which is the chief objection to that class of preparations.

"Carolus" is advised to persevere in the course which he has commenced, and to study the books which he mentions, also Lindley's *Elements of Botany*, and Graham's or Turner's *Chemistry.*

"London, June 24."—Parnell's *Chemical Analysis*, and Sir Humphry Davy's *Agricultural Chemistry.*

"A Member," (Dudley).—Mr. Clark is not a Member.

S.—(1.) We are not acquainted with Macauley's *Dictionary of Medicine.*—(2.) Lavender Water: ℞ ol. lavand. A. ℥ss.; Ess. Amberg. c Mosch. ℥ss.; Otto rosæ gt. ij; sp. Vini rect., ℥xv. M.—(3.) "A lotion for pimples on the face." We cannot pretend to give medical advice.

G. S. (Bromley).—The yellow salt of gold, described under the head *chloride of gold*, in our last number, is a compound of terchloride of gold and hydrochloric acid. This salt, which is sometimes called muriate of gold, should be perfectly soluble in water. The protochloride of Brande (subchloride of Graham) is insoluble in water.

X. Y. Z. (Exeter) states, that in making the binoxide of mercury according to the directions of the Pharmacopœia, he has found the product to be of a bright yellow colour, and not *orange red*, as stated by Mr. Phillips, in his translation of the Pharmacopœia. [Mr. Phillips is certainly wrong in describing the precipitated binoxide as orange red; if the full amount of alkali in the caustic state be employed, the precipitate will be yellow, and this colour will be retained after drying; if an insufficient quantity of the caustic alkali be used, an oxychloride will be formed of an orange red colour. The proportions given in the Pharmacopœia are correct.]

J. S. S. (Berkhamstead).—(1). Hydrochloric acid is capable of dissolving arsenic in considerable quantity.—(2). The spontaneous combustion of sawdust, moistened with boiled linseed oil, when left in a heap for some hours, is most probably occasioned by the rapid absorption of oxygen by the oil. The moistened sawdust exposes an extensive surface of the oil to the air, while the heat developed by the chemical combination being imperfectly conducted away, accumulates to a sufficient extent to occasion combustion. Our Correspondent very justly observes, that dealers in this oil should be

cautioned not to use sawdust for the purpose of absorbing the oil spilt in the warehouse in which it is kept.

H. G. K. alludes to the discrepancies which exist among different chemical writers, with regard to the atomic numbers, and especially to the difference between the statements of Brande and Bellingham as to the equivalents for aluminum and boron, Brande giving 10 as the equivalent for aluminum, and 20 for boron; while Bellingham gives 13.7 for aluminum, and 10.9 for boron. [The numbers given by Bellingham are taken from Berzelius, who has been generally followed on the Continent, and by some of the first Chemists in this country, as Graham, Kane, &c. Brande has always adhered to the whole numbers. In giving 10 as the equivalent for aluminum, alumina is supposed to be a protoxide; the number 13.7 is deduced on the supposition of its being a sesquioxide. The latter opinion is now universally received. We recommend the symbols employed by Graham, Kane, and Turner].

E. J. (Birmingham).—(1). The method of preparing *India-rubber Court Plaister* is described vol. ii. p. 464 of this journal.—(2). The following formula is given by Dr. Paris for *Steers's Opodeldoc*:—take of Castile soap, ℥j; rectified spirit, f.℥viij.; camphor, ʒiiiss.; oil of rosemary, f.ʒss.; oil of origanum, f.ʒj; solution of ammonia, f. ʒvj. M.

W. B. (Wotton) says, he has found by experiment that common oil of turpentine will not burn in the camphine lamps, but that the rectified oil of turpentine will.—(2). He suggests whether the greater degree of acidity in gooseberry puddings made with ripe than with unripe fruit, may not arise from the former having more acid than the latter developed in their seeds and outside coats.—(3). The question of the propriety of publishing in this journal, the courses of morning lectures delivered at Bloomsbury Square, has been before alluded to.

"An Associate" (Leamington).—"Druggists' Price-Book," by W. Forbes. Sold by Baiss, Brothers and Co., 126, Lower Thames Street.

"An Associate."—(1). The change which takes place in ointment composed of lard and liq. plumbi [diacetatis] should be determined by experiment. It may probably arise from the liberation of a portion of protoxide of lead.—(2). The occurrence of a precipitate on mixing old tincture of hops with fresh would induce a suspicion that the former was deficient in the strength of its spirit. New tincture when added to water occasions more milkiness than old, as a portion of the oil of the hop becomes oxidized by keeping.—(3). For the meaning of the terms ℔j. and Oj. *See* the Pharmacopœia.—(4). Aqua menthæ is generally understood to mean *mint-water*, aqua menthæ p. means *peppermint-water*, and aqua menthæ pul. *pennyroyal-water*.

℈j.—In cultivating medicinal plants, it is important to imitate the position and circumstances in which they exist in the natural state. Experience and observation will alone supply the information which our Correspondent requires.

A. F., Copying Ink.—Gum Arabic, 240 grains; Spanish liquorice, twenty grains; Water, 720 grains; dissolve. Then add the solution gradually in a mortar to sixty grains of lampblack previously moistened with a teaspoonful of sherry. When well mixed strain through coarse muslin.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street (before the 20th, if answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. III.—SEPTEMBER 1st, 1844.

SIR JAMES GRAHAM'S PROPOSED MEDICAL BILL.

As it is probable that many of our readers may not be acquainted with the principles of this measure, we have given, in another place (page 138), the speech of Sir James Graham on its introduction to the House of Commons, which is more explanatory than the Bill itself.

It might, at first sight, appear that we are not concerned in the matter, as the Bill contains no allusion to Chemists and Druggists, or the practice of Pharmacy.

But we have always maintained that our body is and must be considered a branch of the medical profession, and that whatever regulations, respecting education, registration, or protection, may be considered necessary for medical practitioners, the same or similar enactments are no less requisite in our department. Consequently, it becomes our duty to watch with attention the progress of any measure which may be introduced for the regulation of the profession, and to take care, either that our body is included in its provisions, or that a separate enactment is provided to supply this deficiency.

We are not prepared, at present, to offer an opinion respecting the comparative advantages of these two courses which are before us, nor is it necessary to come to a hasty decision on the subject, as an interval of several months will elapse before the Bill will be read a second time in Parliament.

This time was purposely allowed for the discussion of the details of the measure out of doors, and, judging from the opinions which we have already heard expressed, we should think that in some respects it is likely to be modified before it passes into a law.

It is therefore, on every account incumbent upon us to observe the course of events, and to be prepared to take up our proper position as soon as the opportunity offers itself.

We believe that the appointment of the "Council of Health and Medical Education" is a provision which is generally approved, although we have heard some objections raised against the manner in which the said officers are to be appointed. The introduction of a more uniform system of qualification in the profession, and the removal of some of the exclusive privileges now belonging to the localities of the several licensing bodies, appear to give satisfaction to a certain extent. On these points we have no remarks to make as they refer exclusively to medical practitioners.

In one respect, the proposed Bill appears to be unsatisfactory to the profession in general. It is laid down as a principle by Sir James Graham, that quackery cannot be prevented by Act of Parliament, and that the prosecution of illegal practitioners is impolitic as well as unavailing. Accordingly, it is proposed to repeal the Apothecaries' Act, and every other enactment which empowers any authorities to inflict penalties for irregular practice; and Sir James Graham advocates the plan of promoting a compliance with the prescribed forms of education and registration by offering *inducements* in the shape of privileges to the qualified, instead of inflicting *punishment* on those who evade the qualification.

The inducements offered to the qualified are, first, the privilege of holding offices in prisons, hospitals, and other public institutions; secondly, exemption from serving on juries, &c.; and, thirdly, the power of recovering debts by legal process. It is also thought that the general registration of qualified practitioners will be a stimulus to all parties, as those who are not on the list will lose caste and be ranked among quacks,

We have seen in several periodicals, in which the protection of regular practitioners is strongly advocated, severe animadversions on this laxity, as it is termed in medical law, and meetings of medical men have been held for the purpose of drawing up

petitions and remonstrances against this portion of the projected measure.

We were quite prepared for this result, having for some time past anticipated that the new bill would be unsatisfactory to those who are in favour of *compulsory* measures. In our number for May (page 513) we gave a concise outline of the general principles which, we had reason to believe, were gaining ground, and which in fact describes in a few words the policy adopted by Sir James Graham.

In the consideration of this policy two questions naturally are involved, and these questions have given rise to warm discussions among medical men:—First, Is it possible to contrive a system of privileges to qualified practitioners which shall adequately protect them and the public against the encroachments of quacks? Secondly, Are the privileges offered by Sir James Graham sufficient for this purpose, and are they likely to act *generally* as inducements to qualify?

The objections which we have heard raised against the Bill are founded upon a belief that neither of these questions can be answered in the affirmative. As the Council of the Pharmaceutical Society has not yet discussed this subject, we abstain from giving an opinion on it at present. In our number for last November (vol. iii., pages 193—7), we stated briefly the chief arguments in favour of *compulsory* measures, and at the same time alluded to the institution of the Pharmaceutical Society as an experiment which would test the efficiency of the *voluntary* system.

The principal grievance which has been urged for many years by medical reformers has been, that the profession did not possess enough power in restraining unqualified persons; and the bill of Mr. Hawes, as well as several other bills which have been projected, were designed chiefly to remedy this alleged evil. It is said, that the Bill now before the House will have an opposite effect, and place the profession in a less advantageous

position, in regard to protection, than before. On this account opposition is anticipated, and the result will mainly depend upon the manner in which the subject is met in Committee. If the Bill should pass in its present form, the members of the profession will have no reason to complain, because they have not united steadily and consistently in the endeavour to promote the *general welfare;* but have, during a long series of years, wasted their strength and influence in party disputes, until at last they lost the opportunity of legislating for themselves, and obliged the government to undertake the task.

We have no desire to make any censorious remarks on the conduct of our medical friends, and allude to the subject with regret. Our only motive for alluding to it at all is as a *warning* to the Chemists and Druggists, whose present and future welfare is dependent upon the judgment and steadfastness with which they continue to act, the unity which they maintain, and the disposition which they evince to merge individual prejudices and party feelings or jealousies for the general welfare.

It is probable that some of our brethren, who are desirous of invading the province of medical practitioners, may cordially approve of a measure which leaves them at liberty to use their own discretion, and even to visit patients, without becoming liable to any kind of interference. But those who take this view of the subject will do well to consider, whether this unlimited licence might not be attended with some disadvantage. If the members of our body are to be allowed to encroach, *ad libitum*, on the medical department, is it likely that we can obtain any protection against the grocers, oilmen, and hucksters, who may, in their turn, feel disposed to embark in a ruinous competition in the sale of medicines? May we not also expect, that if all restraint upon quackery is to be at an end, "doctors' shops" will rise up like mushrooms against us; and that what we lose on one side will much more than counterbalance what we gain on the other?

While we claim a certain amount of liberty, as vendors of medi-

cines, in giving our customers the requisite information respecting the properties and doses of the remedies, it may reasonably be questioned, whether we should be gainers by overstepping the boundary, and professing to act in every respect as medical men. In throwing out these suggestions, it is our desire not to interfere with the deliberate judgment of any individuals, but to discuss the subject temperately, and without prejudice, leaving our readers, from a dispassionate statement of the facts, to form their own opinions as to the comparative merits of the two sides of the question.

It is generally admitted, that the division of labour in the profession is advantageous to all parties, and calculated to ensure to the public the efficient performance of the several functions, and the greatest amount of qualification in the followers of each department. We have, in a former number, advanced the opinion, which further observation has tended to confirm, that if it were possible to define with precision the boundary line between the prescriber and dispenser of medicine, it is probable that much of the difficulty which exists in legislating on the subject would be at an end. But while the Apothecary sells medicine not only to his patients, but to any retail customers who present themselves, the Druggist in self-defence is obliged to overstep the bounds of his office, knowing that if he were in every trivial case to refer his customers to the Apothecary for advice, he would by so doing lose the sale of the medicine altogether. But if it were the custom for each party to perform the duty for which he is by his position and education best qualified, the patient would be better served, the prescriber and dispenser would be more adequately remunerated, and the jealousy between them would cease.

Whether this beneficial division of labour can be most readily effected by compulsory legislation, or by a voluntary arrangement between the parties concerned, is a question on which opinions may probably differ; but there can be no doubt of the fact, that the proposed Bill will leave each individual at liberty to use his own discretion, and those who are too lazy to make them-

selves qualified, may practice as quacks and revel in ignorance unmolested.

We trust at all events that this extreme licence will not prevail in reference to the sale of medicines. Every person who undertakes to prepare prescriptions, or who sells remedies of all kinds, including deadly poisons, ought undoubtedly to be fully acquainted with the properties of these powerful agents, which may either kill or cure according to the mode of administration. It will be our duty, at the proper time, to represent to the government the importance of protecting the public against the danger arising from the indiscriminate sale of such substances, by persons possessing no Pharmaceutical education; and we trust that the exertions our body has already made to promote a general improvement in the qualifications of its Members, will add some weight to the arguments which its representatives may have occasion to bring forward.

It is not our business to take a part in the discussions or disputes respecting the kind of restraint to be imposed upon unqualified persons in medical practice; but whether the practice of medicine and surgery be thrown open altogether, or the stringency of our present laws be increased, we shall, as we have always done, advise our brethren to adhere as closely as possible to their own department, and to avoid any unnecessary encroachment on medical men. We claim as we have always claimed on behalf of our body, as dispensers and vendors of medicine, a certain amount of discretionary power in giving such information to the public as may be required to prevent accidents and admit of the domestic administration of simple remedies; but in claiming the power we shall always insist upon the necessity of using the discretion.

[*To be continued.*]

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

On Wednesday Evening, July the 24th,

A LECTURE

Was delivered at the house of the Society,

ON THE DETECTION OF METALLIC POISONS.

BY ANDREW URE, M.D., F.R.S.
Honorary Member of the Pharmaceutical Society, &c. &c.

Dr. Ure introduced his lecture with the following observations:

Though all the productions of nature have been created by infinite wisdom for beneficent purposes, and, when rightly employed, are capable of doing good in various ways, yet through the malice, carelessness, and ignorance characteristic of our race, they have been too often made subservient to evil purposes and fatal results.

Each of the three kingdoms, the mineral, the vegetable, and the animal, abounds in substances which act energetically on the living organs of man and other creatures; if duly administered, these may exercise a healing virtue on the disordered functions, and alleviate, or even remove, many of the ills which flesh is heir to; but, if given injudiciously as to disease, age, and temperament, they may derange, or even extinguish the powers of life. While the advancement of the knowledge of nature has been in general accompanied with good, it has been, alas! too often made to minister to evil. Science, thus perverted, proves too painfully that the tree of *knowledge* is very different from the tree of *life*, though they were both originally planted near each other in the garden of Eden, and both still flourish together on our degenerate soil. It becomes, therefore, a paramount duty of science, to counteract, by every means of admonition, detection, and antidote, the injurious operation of the numerous inorganic and organic substances hurtful to health, whether as presented by nature, or as elaborated by art.

This department of human knowledge lies entirely in the domain of chemistry, and has been styled toxicology. It has been the object of multiplied painful researches, and the subject

of many valuable dissertations. It is not my intention, on the present occasion, to expatiate at large in this ample field, but to confine my attention to one region, viz., that of metallic poisons, reserving the consideration of the noxious organic compounds till some future time. The few poisonous non-metallic substances belonging to the mineral kingdom, are comparatively of easy detection.

The poisonous metals, which have most usually exercised baneful effects, by accident or design, are,

1. Arsenic; 2. Antimony; 3. Lead; 4. Copper; 5. Mercury; 6. Silver; 7. Zinc, and 8, perhaps, Bismuth.

Arsenic is the substance, which in the quantity least appreciable by our senses, can prove most injurious; and as the methods invented for its detection and counteraction serve in a good measure for the others also, I shall make it the principal object of our present lucubrations. These eight noxious metals may all be precipitated, with their appropriate characters, from their saline solutions by sulphuretted hydrogen.*

I need not detain you long with a detailed description of the frightful symptoms of a dangerous dose of arsenic. They commence, in general, very soon after the substance has been swallowed; and are, in a few words, pains of the stomach, with an indescribable feeling of anxiety, then a burning sensation in that vital organ and in the intestines, an inextinguishable thirst, followed too soon by violent retchings, colic pains, furious diarrhœa, with ulcerated rectum, cold sweats, contortions in all the limbs, mortal agony, convulsions and death. These frightful phenomena have, in some strong constitutions, lasted for six or eight hours; but, in a few cases, death has supervened without being ushered in with that formidable train of symptoms.

Dr. Black, long ago, and since him Orfila, Berzelius, and many other able chemists, have devoted much thought to the surest means of detecting and distinguishing arsenic in the contents and *egesta* of the stomach and bowels. Very lately, Duflos and Hirsch, apothecaries in Breslau, have collected into one focus all the scattered rays of this branch of toxicology, and set it before the public eye in a little work, entitled *Arsenic, its Recognition and supposed Occurrence in Organized Bodies*. This pamphlet is very judiciously composed, and does honour to the dispensing chemists of Germany, who are for the most part, in their science, not a whit behind the most famous chemical professors of other countries. They state that, according to Bunsen and Berthold, about nine-tenths of all cases of poisoning are

* Dr. Ure exhibited at this part of the lecture the results of the action of sulphuretted hydrogen on the saline solutions of these metals.

occasioned by arsenic. Perhaps the most valuable portion of their labours is the elaborate series of experiments to investigate the reality of Orfila's allegation, of arsenic being a usual constituent of the human body*. They have, in my opinion, completely refuted this notion. They begin with a clear summary of the chemical habitudes of arsenic:—First, in its metallic state, whether alone or combined with metals, hydrogen, and other combustible bodies; secondly, in its oxidized state, of the arsenious and arsenic acids; and, thirdly, in that of sulphuret, or orpiment, and king's yellow or yellow fly-powder. Under each head they treat fully of the various methods of detecting the substance.

In examining for the most common form of the poison, viz., arsenious acid, they say, that by dipping a slender splinter of charcoal in a solution containing only $\frac{1}{250}$ of that body, drying it carefully, and exposing it in a glass tube to a strong red heat, by an Argand spirit lamp, they obtained a coating of metallic arsenic on the cool part of the tube. The unimpregnated end of the charcoal should be first ignited. Sometimes, for more satisfactory proof, they dip the same fragment of charcoal once and again in the poisonous fluid.

On the production of arseniuretted hydrogen gas, by Mr. Marsh's well-known method, they have made many useful observations. For distinguishing the metallic stain of antimony from that of arsenic, they hold a small funnel moistened interiorly with steam, over the jet of burning hydrogen, whereby they oxidize the film of arsenic but not of antimony, and they then test the particle of arsenious acid with nitrate of silver, which gives the characteristic yellow stain of arsenite of silver. Berzelius transmits the hydrogen from Marsh's apparatus, over copper reduced by pure hydrogen, and placed in a glass tube, ignited by a lamp-heat, whereby he forms an arseniuret of copper; and from the weight of the alloy, determines the amount of arsenic. This quantitative result is of no use, because Marsh's method affords only a part of the arsenic present in the poison. But the experiment is valuable in another respect, since the whitened copper emits, on being heated, the garlic odour peculiar to the volatilization of metallic arsenic. Antimony is not rendered soluble by water, nor does its compound with copper give out the garlic smell. Duflos and Hirsch prefer the black oxide of copper to reduced metallic copper for this trial; and reckon it a great improvement upon Marsh's plan.

The excess of acid may be easily removed from the alloy by dilute hydrochloric acid; and the greyish-white metallic powder thus obtained, after being well washed with the dilute acid, and

* Orfila was himself the first to discover and acknowledge the error into which he had fallen.

dried, evolves, from a particle thrown on red-hot coal, the garlic smell; and when heated in a glass tube, gives the mirror spot of metallic arsenic, which may be oxidized with contact of air, and verified in many ways.

N. W. Fisher suggested, some time since, the method of detecting arsenious acid by a single voltaic pair. He places a glass tube, having its lower end closed with bladder, into a narrow cylinder of glass. Into the top of the inner tube, which is shut with a cork, he introduces on the one side a platinum wire, and on the other a small glass syphon. The wire passes down to near the bladder, and to its outer hooked end a slip of zinc is attached, which hangs down in an acidulated solution of sal ammoniac contained in the interval between the two glass tubes. On filling the inner tube within $\frac{1}{4}$ of its top, with the poisoned fluid previously acidulated with nitric acid, should arsenious acid be present, the metal will be deposited upon the platinum wire in the form of a dull film, if it be in very small quantity; but otherwise with its proper lustre. Its identity may then be demonstrated by the smell when volatilized and otherwise. Arseniuretted hydrogen will escape from the syphon, and it may be tested by itself, or preferably by transmitting it through a saline solution of silver, whereby a black precipitate of metallic silver falls, and arsenious acid remains in solution. The excess of silver is easily removed by hydrochloric acid, and then the arsenious acid may be converted into the arsenic by evaporating the liquid to dryness in a porcelain cup. This plan of searching for arsenic has the advantages over Marsh's of not requiring pure zinc, and of not leaving any of the arsenic in the liquor. It is not, however, nearly so minute in its indications as Marsh's, and requires two or three days to accomplish, though it might be accelerated by using a weak voltaic battery. Marsh's method is said to detect $\frac{1}{500000}$, Fisher's only $\frac{1}{5000}$ of arsenic; but this quantity will probably be found conclusive in most cases.

The next test of arsenic proposed by Duflos and Hirsch is sulphuretted hydrogen; and this being the one which I have been always accustomed to prefer, I am willing to dwell upon it in some detail, especially as it is also preferred by Drs. Fresenius and Babo, in their able dissertation on this subject. The fallacies incident to sulphuretted hydrogen, as a test of arsenic, are the following; but they may all be obviated by sure criteria. Thus,

1. That gas affords, with a solution of cadmium, a yellow precipitate, very like orpiment; but it is distinguished by its non-solubility in the water of pure, of carbonated, or of hydrosulphuretted ammonia.

2. Solutions of antimony yield an orange-coloured precipitate, insoluble in a solution of carbonate of ammonia.

3. Solutions of tin give a pale yellow precipitate, insoluble in water of pure and carbonated ammonia.

4. Sulphur, when thrown down, is known by its insolubility in caustic and carbonated ammonia.

After describing the methods prescribed by Fresenius and Babo, for obtaining a clear solution of arsenic acid, from the mixed contents of the stomach, bowels, &c., Dr. Ure exhibited an apparatus, for disengaging and testing the poison in a variety of forms at one operation. It consisted of a matrass containing a slip of zinc, closed with a cork, through which the stem of a small glass funnel descended to near the bottom of the vessel, while a glass tube just passed through the cork, and being bent externally at right angles, conducted any disengaged gas into one end of an U glass tube, charged with bits of chloride of calcium. The other end of the U tube was connected by a short tube of caoutchouc with a narrow tube of Bohemian glass, whose further extremity was bent at right angles, and pointed at the end. Pure dilute hydrochloric acid, being poured into the matrass, hydrogen was evolved, and being subjected to the heat of a spirit lamp placed under the Bohemian tube, showed by the non-formation of the mirror film, that there was no arsenic in the materials employed. A few drops of an arsenial liquid were then introduced into the matrass, and immediately the metallic mirror was produced. The gas issuing from the extremity of the tube being lighted, and the flame made to play upon a bit of white porcelain, the mirror stain instantly appeared. On extinguishing the flame, the effluent gas was passed through a dilute solution of nitrate of silver in a test tube, with the effect of precipitating the metallic silver, while the arsenic acid remained in the solution, ready to be subjected to a variety of other tests. Dr. Ure has observed, that the introduction of a little putrid animal matter causes a prodigious intumescence in the matrass, if arsenic be present, but not otherwise.

The doctor then gave a summary view of the researches of Fresenius and Babo, for which see page 133.

ORIGINAL AND EXTRACTED ARTICLES.

FURTHER REMARKS
ON THE
PISCIDIA ERYTHRINA, OR JAMAICA DOGWOOD.

BY WILLIAM HAMILTON, M.B., H.M.L.S.

Having, in my last communication, confined my remarks on this plant to the limited results of my own personal experience, I propose, in my present, to call the attention of the professional

world to the observations made by former writers, and to the medical uses to which this bark had been previously, and, not improbably, yet continues to be, applied.

The Piscidia erythrina is extensively distributed throughout the Archipelago of the Antilles, and flourishes chiefly in the lowlands, and on dry calcareous or volcanic hills in the vicinity of the sea; flowering in the spring months, and chiefly in April, when the tree is bare of leaves, which rarely appear before the departure of the blossoms: these are diadelphous, of a whitish colour, forming terminal thyrsoid racemes, and are succeeded by compressed, membranaceous winged legumes, containing roundish seeds. These seeds not improbably partake of the medicinal properties of the bark of the roots; and, at all events, merit the labour of experiment.

The dogwood-tree, as far as my experience goes, is of moderate dimensions—those which I met with on Saddle-Hill, in Nevis, averaging the height of good apple trees; but in Guadaloupe and Dominica I have met with specimens of a somewhat more aspiring stature. The timber, which I had not myself an opportunity of examining, is described by Lunan, in his *Hortus Jamaicensis*, as being of a lightish brown colour, coarse, cross-grained, ponderous, firm, and resinous; well adapted for piles for wharves, from its great durability, both in and out of water. It is easily propagated by seeds or cuttings; and stakes cut from it soon take root, and form an excellent live fence.

As I have reason to believe, from its insolubility in any other menstruum than highly rectified spirit, that the narcotic principle of the bark of the roots resides in a resin, and as this resin abounds, according to Lunan, in the timber of the tree, which derives from hence no doubt its great durability, even when immersed in water; this resin, during, or immediately before the development of the flowers, merits the examination of the medical inquirer, not only as furnishing the article, required for the purposes of Pharmacy, with less injury to the tree, but as affording it in a more portable, and less perishable form; for the tincture, described in my last communication, rapidly loses its active properties, as far as my experience goes, from the action of light and heat, which, separately or conjointly, appear to decompose the preparation, by detaching the resin from its solvent, and thus lessening the intensity of colour in the tincture. It may have been from this cause that I was disappointed in the effects which I anticipated from the preparation made for me by Menzies and Co., of Kingston, Jamaica; and it is probable that equal disappointment will attend any tincture prepared in the West Indies; hence, for the purpose of fair experiment, the bark of the roots in substance, the resin of the timber (both *procured at the proper season*), and the pods, with the seeds they contain, gathered after

attaining their full growth, but while the sap is yet in them, together with pods fully ripened and containing the seeds, should be obtained from the West Indies.

According to the notes I made at the time, the preparation of the bark for the sport of fish poisoning is as follows:—Being detached from the roots it is mashed up with what is termed, in the West Indies, *temper-lime* and the low wines or lees of the still-house, and the mixture distributed into small baskets, from which it is washed gradually out by persons holding the baskets in the water from boats, slowly propelled by oars, or stationary in some small bay. Lunan describes the process somewhat differently; stating, that the bark is "pounded very small, and mixed with the water, by being put into sacks, in some deep and convenient part of a river, whence it spreads itself, colouring the water of a reddish hue, and in a few minutes the fish, that lie hid under the rocks and banks, rise to the surface, where they float as if dead. Most of the large ones recover after a time, but the smaller fry are destroyed. Browne observes, that the eel is the *only* fish he noticed that could not be intoxicated with the common dose, though it was sensibly affected; for the moment the particles spread where it lay, it moved off with great agility through the water; and he saw them sometimes chased to and fro in this manner for some minutes, without sustaining any injury. Lunan is silent as to the addition of the lime and the low wines, both of which are essential to the solution of the intoxicating constituent of the bark, and its diffusion through the water. As my notes were made on the spot, I can speak with the more confidence as to the mode of preparation which I witnessed, and which may, perhaps, suggest some improvement upon my form for preparing the tincture. The eels spoken of by Browne, as so insensible to the intoxicating influence of the bark, were probably the common fresh-water eel. But the large spotted sea eel, with a crested head, commonly known in Nevis by the name of the conger-eel, though widely differing from the voracious fish of that name found on our own coasts, appeared to me to be considerably affected by it; not, indeed, by being stupified, but swimming about in the phrenzy of intoxication, and rearing its crested head high above the surface, as if striving to escape from the pestilential medium. In St. Vincent, the Charaibs, as I was informed, were in the habit of taking the larger fish by a stratagem somewhat different, and seeming to imply a material difference in the chemical properties of the substance employed. Their plan was to fill the bellies of small fish caught for the purpose with a preparation of the roots of a plant called by them Wonga (?), and throw them, thus prepared, into the water to be devoured by the larger fish, whose lives were the forfeit of their rapacity, the intoxication,

resulting from their prize, making them an easy prey to the fisherman. What is the plant so named, and what are its specific properties?

Previous to my experiments upon the internal use of the dogwood bark, I am not aware of its application, otherwise than as an external application to some cutaneous diseases of men and animals. For this purpose, a tincture was prepared by macerating the bark in low wines, and used successfully as a wash for the mange in horses and dogs, and for psora and other disorders of the human subject.

Dr. Barham, of Jamaica, indeed informs us, in his *Hortus Americanus*, published in 1794, that he employed this bark, which he found very restringent, in the shape of a decoction, to cleanse and stop the great flux of ulcers, and make them fit to heal, and cure the mange in dogs (p. 52); but it does not appear that he made any experiments upon its internal effect, and, if he had, he would have found the decoction an inert form of exhibition.

Before I conclude, I may perhaps be permitted to touch briefly upon the much disputed question of sol-lunar influence, which the philosophical sceptics of our frigid climate boldly deny, but which obtains general and not unmerited credence in the warmer regions within the tropics. Soon after my arrival in the West Indies, in the month of March, my attention was practically directed to the observation in Horace, that

"Lubrica nascentes implent conchylia lunæ,"

by a dish of echini, or sea eggs, as they are termed, which is accounted a great dainty, but is only in season at the period of full moon. Inattention to this influence led to my disappointment on a repetition of my experiments with the dogwood bark, and a similar inattention will lead invariably to similar results. But it appears to me that this influence is subject to considerable modification, arising from the season of the year; its effect upon vegetation being most powerful in the vernal months. To determine the reality of its existence, I compared, by actual measurement, the growth of plants during the increase and decrease of the moon, and found a most marked and enormous difference. Influences which become imperceptible as we recede from the tropics, display themselves in the most exaggerated forms as we approach the line, and that which excites the sneer of incredulity in Britain, becomes a matter of faith in Italy, and of fact in Trinidad, Essequibo, or Demerara. But I have exceeded my limits, and must for the present conclude.

14, *Octagon, Plymouth.*
22d July, 1844.

THE DETECTION OF POTATO-STARCH IN FLOUR.

BY MR. THOS. HARVEY.

Having occasion recently to examine a sample of suspected flour, I turned to *Christison's Dispensatory*, and found, under the head "Farina," the following remark: "Potato-starch is detected by kneading the flour with a thin stream of water over a cloth filter; allowing the starch to subside in the filtered water, triturating the lower stratum with water in a mortar, and testing this with iodine, which strikes a blue colour if potato-starch be present, *and merely a yellow or red colour if the flour be pure*."

On rubbing down a few grains of *wheat* in a mortar, and washing the starch through a filter with distilled water, I found it turn a dingy violet-blue on the application of the iodine test; and conclude, therefore, that the inviting and facile process above-quoted, is entirely un-trustworthy.

As it seemed desirable to correct an important error in a work so highly esteemed and usually so valuable, I have taken the liberty to notice the subject.

[The microscope, probably, furnishes the best means of detecting the presence of potato-starch in wheat-flour.—Ed.]

ON THE APPLICATION OF LIGHT POLARIZED CIRCULARLY TO THE INVESTIGATION OF CHEMICAL AND PHYSIOLOGICAL PHENOMENA.

BY THOMAS ANTISELL, ESQ., M.R.C.S L.
Lecturer on Botany in the Dublin School of Medicine.

The application of the circular polarization of light to chemical science, is one of the greatest aids which has been added to research of late years, especially regarding those carbonated products of organized bodies, which in some cases are isomeric, and in others isomorphous with each other, and compel the analyst to perform the most circuitous and delicate processes to isolate a given substance for examination. In some cases, by these means, the object of search eludes the attempt, by being transformed into one or other of the many formulæ, which carbon added to the elements of water present, and in the case of detecting sugar in organized structures, that ingredient is voluntarily decomposed (by fermentation) in order to demonstrate its previous existence; it is in such difficult cases as these that the benefits derivable from circular polarization are most evident, as not requiring any isolation from the whole mass, nor any change of molecules while operating; and giving a faithful account, not only of the ingre-

dients contained, but also of their actual amount. This has been very beautifully shown by the researches of Biot,* upon the change effected in the ascending sap, by the foliaceous organs of exogenous plants, from which the following results affecting the physiology of vegetable growth have been obtained.

That in plants of the grass tribe, with the ear not developed, the extract obtained from the roots contained a quantity of uncrystallizable sugar; and the stem of some contained cane sugar, grape sugar, and gum. During the development of the ear, the cane sugar increased in quantity, which, as the ear approached fecundation, and afterwards was converted into sugar of starch, and starch for the assimilation of the ear: so that one of the effects of fecundation, appear to be the metamorphosis of cane and grape sugars into starch and sugar of starch. The same phenomena were observable in the stems of wheat—the cane sugar being predominant at first, the grape sugar gradually increasing up to and during flowering, when it in its turn gave way to the existence of starch sugar.

That cane sugar is formed most abundantly in the leaves, and grape sugar in the young stem; so that the carbonated principles of plants would appear to be derived in the first period of growth from the roots, and in the latter period from the leaves. From fecundation onwards to the perfect ripening of the ear, the aliment required appears to be SOLELY supplied by the leaves, which emptying themselves into the stem, of the cane sugar which they contain, commencing at the basal leaves and finishing with the terminal leaves, immediately after wither and die away. The root during this time supplies no organized product to the ear, and its functions appear to have ceased, as it is a fact notoriously well known, and acted on, that the ears of corn become fully ripened after being reaped, equally well as if they were still connected to the roots.

25, Richmond Street South, Dublin,
July 29, 1844.

ON THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—A case of poisoning by oil of bitter almonds, reported in the *Lancet*, of June the 8th, by Mr. Smith, of Clifton, and happily treated successfully by the joint efforts of another medical man and himself—induces me to notice the careless, I had almost said reckless, custom which prevails among Chemists and Druggists

* The accuracy of some of Biot's conclusions has been called in question by Dr. Leeson, in the *Philosophical Magazine*, a few months ago.—ED.

of selling this article in small quantities, both in its original state and also in a form of much greater concentration for culinary purposes than is at all compatible with the safety of the public. Indeed I may say, that while I am fully aware of the extreme difficulty which the subject involves, I am quite sure that one of the most dangerous evils that exists in the retail trade is, the facility with which the smallest quantities of deleterious articles may be generally procured; and I question much whether the good that would result, if it were possible to prohibit the custom, would not greatly outweigh the inconveniences resulting therefrom. With respect to the article of oil of bitter almonds—the use to which it is applied for flavouring spirit, has not only opened the door to its sale among large consumers, but any body may now-a-days obtain a little who has a mind to make his own ratafia or noyeau. The more objectionable form however to me is, the one from which the nearly fatal case alluded to above resulted, and that is the sale of the essence (as it is called) of almonds, where a few drops are directed as sufficient to flavour a pudding or custard. Now when we consider the hands into which these said essences generally come, and the careless way in which cooks are accustomed to guess at their proportions, and how little used they are to the word "Guttatim"—I do think it would be much safer to supply the public with a more diluted article—in which spoonfuls might be used, and when the tempting flavour of the bottle, left carelessly about, would not involve anything like so much danger to those who like to have a taste of what smells so very nice.

Another practice which the subject leads me to reprobate—is that of allowing the public generally to purchase in the same small quantities (as to value) the most powerful remedies, even some of the newest, as readily as salts, jalap, &c. I have known persons actually come into the shop for a pennyworth of morphia, and as to colchicum wine — it is as common as laudanum, not to mention other articles of like power and importance.

Now, however desirable it may be to allow the poor to obtain physic cheaply, and however difficult it may be for the Druggist to discriminate, I confess I see no hardship in preventing the public from tampering with such powerful remedies, nor do I think the Druggist should, even under the existing state of things, serve any body with deleterious articles of the kind alluded to, without taking some pains to ascertain that the party requiring them knows what he is about—it is no excuse to say that it would consume more time than the article is worth.

Some years ago, we find from your *Historical Sketch*, that the Druggists' Association issued a recommendation to the trade to put the word *poison*, in legible characters, on all deleterious

articles, a practice which is still very generally and most properly followed; but it is rather awkward to put "Poison" on articles recommended for the palate, though in fact they are in some cases really so. Besides, knowing as we do, the little attention which is too frequently paid by persons to the plainest labels and directions, and knowing too, that for convenience sake some articles are ready put up and labelled "Poison," in order to serve them quickly, I think it is not altogether a useless suggestion to my brethren to say, that it is their duty not to allow their constant contact with deleterious articles, or their sharp habits of business behind a retail counter, to prevent them from both personally and by their assistants, speaking to, and if needful, warning their customers who apply for such articles. It would inform the public of their nature, it would, I am persuaded, prevent many accidents; and in fact is, after all no more than the bounden duty of the man who may literally be said to have the lives of his connection daily in his hands, and I cannot help again saying, that I heartily wish the trade would altogether discourage the sale, in small quantities, of really powerful remedies for private use. Much more might be added upon this important topic, but I have already perhaps exceeded the limits of a communication.

Yours, &c.,

July, 1844. A Druggist.*

ON THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I beg respectfully to call your attention to a paragraph which appeared in the *Times* of this morning, under the head of "Suicides in Leicester."

There are contained in that paragraph no less than four cases of poisoning by arsenic: three of the four have proved fatal! I am sure it must be a most painful reflection to those parties who have supplied this deadly poison to think of the melancholy results; and I sincerely hope that these dreadful facts will act as a warning to all Chemists and Druggists in Leicester, and in every other town in England, not to supply arsenic on *any* pretence

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* The above letter should have been published last month; but was deferred for want of space. We quite agree with both our Correspondents in the opinion, that much mischief results from the indiscriminate sale of poisons, and that every opportunity should be taken to impress upon the minds of Chemists the necessity of more caution.—Ed.

whatever, or to any person, however well known the applicant may be to the party applied to for it. For my own part, I never sell arsenic, nor substitute any other preparation when arsenic may be asked for, as I consider this latter practice highly objectionable. Even when asked for "fly-powder poison," I have a great objection to supply this preparation, and frequently refuse it to the party who may ask for it, unless very well known to me. There are many other preparations which I think ought to be also denied, such as laudanum, prussic acid, sugar of lead, crow-fig, syrup of poppies, oxalic acid, and many others; but these may be left to the discretion of the vendor, whether he considers himself justified in supplying them or not: but too great precaution cannot be observed for the safety of the public, and the reputation of Chemists and Druggists generally.

I remain, Sir, your most obedient Servant,

M. P. S.

London, July 26th, 1844.

ON CHICORY, OR WILD SUCCORY.

In a previous number * of this journal we had occasion to mention *chicory* as a substance extensively used for the adulteration of coffee: and as many of our readers may be imperfectly acquainted with this substance, a short notice of it may not be unacceptable.

The term *chicory* is an anglicised French word, the original being *chicorée*. Its introduction into our language was quite unnecessary, seeing that we already possessed an English name for the substance in question, namely, *wild succory*.

The plant is known to botanists by the name of *Cichorium Intybus*, and belongs to the natural order *Compositæ*, tribe *Cichoraceæ*. It is an indigenous plant with a perennial root, and flowers in July and August. Its stems are two or three feet high and branched. The flowers (which are about the size of those of dandelion) are handsome, and bright blue with blue anthers and stigmas. A variety of the plant has white flowers.

The root, the *radix cichorii* of pharmacologists, is spindle-shaped, with a single or double head: externally, it is whitish or greyish yellow; internally, whitish, fleshy, and milky. The roots grown in this country are smaller, and more woody or fibrous than those which are imported.

Wild succory, or chicory, is cultivated in various parts of England. Surrey (near Godalming), Bedfordshire, and Yorkshire, have been mentioned to us as places where it is now

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* See *Pharmaceutical Journal* for August, 1844.

grown. But whether it be that the soil is inferior, or that the farmers do not know the best mode of cultivating it, certain it is that British chicory is much inferior to the foreign. We have heard one dealer complain that the British cultivators do not cut off the *tails* of the roots before sending them to market. New seed (fruit) we have been told, always yields more woody, and, therefore, inferior, roots than old seed. In point of price English farmers cannot compete with the foreign cultivator. Foreign chicory may be bought, in bond, for from £5 to £10 per ton, while British chicory fetches about £18; but as the foreign chicory pays a duty of £20 per ton, the British grower is protected to this amount.

Chicory is cultivated in Prussia, Belgium, and in France. The Prussian is the best, being more fleshy than the other kinds. It is imported by way of Hamburgh, while the Belgian and Flemish come to us from Antwerp. There is no official return of the quantity which is annually imported, but an extensive importer estimated it at about one thousand tons, which will yield a revenue of £20,000 per year. The duty on roasted chicory is £56 per ton, which acts as a prohibition, so that chicory is imported in the raw state.

The dried roots are roasted in this country like coffee. The loss during roasting is from twenty-five to thirty per cent. The roasters generally introduce into the roasting machine about two pounds of lard for every hundred weight of chicory. The reason assigned for this practice by one dealer, was, that the lard gave the chicory a better face; while another dealer declared that it was done to render the powder less hygrometric. Inferior kinds of chicory are artificially coloured with *Venetian red.* Some roasters introduce this into the lard before the latter is put into the roasting machine; others add the colouring matter to the chicory when grinding it, after the roasting.

In a previous number we explained the nature of *Venetian red.* It is essentially the sesquioxide of iron, obtained by calcining common copperas (sulphate of iron). The different colours of the product depend on the temperature to which the sesquioxide is subjected. When it has been exposed to an intense white heat its colour deepens, and it is then termed *purple-brown.* The lighter tint of Venetian red is produced by adulteration. Our informant (a manufacturer) told us that Venetian red was "adulterated to suit the various prices of the market." We did not think it expedient to pry into the nature of the adulterating ingredient, but a friend suggests that it is *reddle*, the substance used for marking sheep.

Venetian red is, we believe, the principal substance at present used for colouring chicory; occasionally other agents have been

employed. A dealer tells us that he once bought a quantity of chicory which contained 20 per cent. of logwood and mahogany dust.

Chicory is extensively adulterated with roasted pulse (as peas and beans), damaged corn, and coffee husks (*coffee-flights* as they are technically called), and coloured by Venetian red. We have also heard of parsnips having been roasted, ground, and mixed with chicory. We stated in a previous number that *Hambro' powder*, which is used as a fictitious chicory, consists of roasted pulse (peas usually) coloured with Venetian red. Treacle is sometimes introduced into fictitious chicory, to give the caramel or saccharine odour possessed by real chicory. There are four characters by which adulterated chicory may be distinguished from the genuine.

1st. It yields to cold water a much weaker colour. In using this test it is necessary to have a sample of genuine chicory for comparison.

2dly. A decoction of chicory, containing either roasted grain or pulse, yields, when cold, a purplish or bluish black colour with a solution of iodine; whereas a corresponding decoction of genuine chicory is merely coloured brown by iodine.

3dly. The microscope detects, in adulterated chicory, the torrefied starch grains of either corn or pulse. That they are starch grains is shown by the action of a solution of iodine, which blackens them.

4thly. The odour and flavour will sometimes detect adulterations.

Roasted and ground chicory attracts water from the air, and thereby increases in weight and becomes clammy. The grinders are accustomed to return as much by weight of ground chicory as they receive of the unground root: for the loss which the root suffers by grinding is more than compensated for by the absorption of water from the air. We have been informed, that some dealers put up their packages of powdered chicory somewhat short in weight, and then place them in a damp cellar, in order that they may absorb water and thereby acquire their proper weight.

The principal use of chicory is for the adulteration of coffee; besides lowering the price, it, in the opinion of some persons, improves the flavour of coffee. The substance sold as *Taraxacum Coffee* is, we are told, made with British chicory. Chicory has also been used for adulterating snuff and colouring beer (porter).

P.

ON THE ANALYSIS OF THE SUBSTANCE USUALLY TERMED BLACK-ASH.

BY RICHARD PHILLIPS, JUN.

The analysis of this compound is rendered interesting by its comprehending not only all the impurities which are usually met with in the alkalies, but also the method of ascertaining the carbonate and caustic alkali when associated with them. Its impurities are sulphate and sulphite of soda, chloride of sodium, and the sulphurets of sodium and calcium, with sometimes some silica and oxide of iron.

To ascertain the caustic alkali contained not only as such, but in the carbonate, a weighed portion, say 100 parts, is to be dissolved in cold distilled water, the insoluble washed on a filter, and the filtered solution to which about twenty grains of chlorate of potash has been added, is to be evaporated to dryness, without exposure to air. The residue is then to be redissolved in distilled water, and the quantity of alkali estimated by the alkalimeter (see *Pharmaceutical Journal*, pages 433—9).

By this process the earthy matters and sulphuret of calcium being insoluble in cold distilled water, are first separated, and then the chlorate of potash being decomposed, its oxygen converts the sulphuret of sodium and the sulphite of soda into sulphates of soda.

Another portion is then to be treated with cold distilled water, and the insoluble matter washed on a filter as before, and to the solution is to be added nitrate of barytes and nitric acid in excess. The precipitate and solution are then to be boiled, filtered, washed, and heated to redness. By the nitrate of barytes a sulphate of barytes will be precipitated, which precipitate being insoluble in nitric acid, and all the other salts of barytes which may be precipitated with it being soluble in it, the quantity of this precipitate will indicate the quantity of sulphate of soda.

To another cold filtered solution, nitrate of silver is then to be added as long as any precipitate takes place, and then to the precipitate caustic ammonia; by it all the chloride, sulphite, carbonate, and oxide of silver precipitated will be redissolved, and the sulphuret of silver obtained from the decomposition of the sulphuret of sodium left, which is to be well washed and dried on a sand-bath. To a filtered solution made in the same manner, but with boiling distilled water, add when cold, nitrate of silver and ammonia as before; filter, wash, and dry the preci-

pitate. Both the sulphurets of sodium and calcium being soluble in boiling distilled water, the excess of this precipitate over the last, will indicate the quantity of sulphuret of calcium. The insoluble residue from this solution is to be dried and weighed, as by it the quantity of earthy matter will be shown.

To a cold filtered solution, to which nitrate of silver has been added, add nitric acid in excess, and heat the precipitate and solution. The chloride of silver being insoluble in nitric acid, and the sulphite, sulphuret, carbonate, and oxide, soluble when heated with it, this precipitate, which occurs from the decomposition of the chloride of sodium, will indicate its amount. The precipitate must be well washed, and heated almost to fusion.

To 100 parts placed in a stoppered bottle, add lime water in excess, or until the clear solution gives a precipitate with oxalate of ammonia, wash the precipitate by decantation, and dry on a sand bath. By this process the carbonate of soda will precipitate a carbonate of lime from the lime-water, from which the quantity of the former may be found, first subtracting however from the precipitate the amount of matter insoluble in cold water. Great care must be taken to avoid access of air, the carbonic acid of which would not only precipitate carbonate of lime from the lime-water, but likewise by acting on the caustic alkali, the same effect would take place.

From a weighed quantity of the substance placed in a counterpoised bottle containing hydrochloric acid (the usual precautions to avoid loss by moisture having been taken) find total loss. This operation will decompose the sulphurets of sodium and calcium, and the carbonate and sulphite of soda. The quantity of sulphur in the two first of these substances having been previously ascertained, by allowing for one atom of hydrogen having been given off with every atom of sulphur, and deducting this quantity added to the amount of carbonic acid also previously ascertained, the remaining loss will be the sulphurous acid from the decomposed sulphite of soda, from which its quantity may be calculated.

I shall now proceed to notice the calculations for the estimation of the quantities. By the first experiment we find the total quantity of alkali, and having afterwards ascertained the amount of carbonic acid by means of the carbonate of lime, every 50 parts containing 22 parts, which carbonic acid would have united with the 32 parts of soda to form carbonate of soda, deduct from the total amount of alkali, as shown by the alkalimeter, the amount united with the carbonic acid, and the remainder will be the caustic alkali.

Of course from this calculation the quantity of carbonate of soda will be shown.

The earthy matter, such as silica and iron, will be given by the residue left in boiling distilled water—the sulphuret of silver precipitated from the cold solution will indicate the quantity of sulphuret of sodium, every 124 being equal to 40 parts, and then by deducting this amount of sulphuret of silver from the quantity obtained from the boiling solution by the residual quantity, will be shown the sulphate of calcium, every 124 parts being equal to 36—the chloride of sodium is to be calculated from the chloride of silver, every 60 parts of the former being equal to 144 of the latter—in the same manner the sulphate of soda from the sulphate of barytes, every 116 parts of the latter being equal to 72 parts of sulphate of soda.

In ascertaining the quantity of sulphite of soda from the total loss by hydrochloric acid, the quantity of sulphuretted hydrogen evolved from the decomposition of the sulphurets having been ascertained from the sulphuret of silver, every 124 parts of the latter being equal to 17 of the former, and this loss being added to the loss of carbonic acid, every 32 parts of the remaining loss will indicate 64 parts of sulphite of soda.

It is possible that in some samples of black ash, all the impurities I have described may not be present, whilst others may contain such as I have not mentioned; but the rules which I have given will be sufficient for the detection of the *usual* impurities, although I have not attempted to make them so complete as to comprehend every case which by possibility may occur.

Craig's Court, August 12th, 1844.

ON THE PREPARATION OF QUINA, AND CINCHONIA.

BY M. F. E. CALVERT.

M. Calvert considers that the reason the manufacturer so often obtains different amounts of quina from the same kind of bark, is, that it is soluble in excess of the reagents used to precipitate it, and sometimes (as for instance, in the chloride calcium, formed when lime-water is employed) from the compound resulting. M. Calvert then proceeds to enumerate the different agents which he tried, all of which had the effect of redissolving when employed, namely, lime-water, caustic ammonia, and caustic and carbonate of potash; when caustic soda, however, was employed, a different result ensued, no re-solution taking place; and here it will be as well to mention the test employed for ascertaining this fact: to the clear alkaline solution was added to saturation hydrochloric acid; and to this neutral solution, solution of chlorine and ammonia, no green colour was produced, which would have been

the case had there been either a trace of quina or cinchonia present.

M. Calvert concludes by noticing the methods for ascertaining quantitatively the amount of sulphate of cinchonia which may be mixed with the sulphate of quina; he however appears to consider there is no better plan for this purpose than the one generally adopted; namely, that of precipitating the two by an alkali, and then redissolving the sulphate of quina in ether, providing, however, as will be seen from his previous remarks, that the alkali employed be caustic soda. As a qualitative test, M. Calvert proposes that chloride of lime be used, it redissolving the sulphate of quina, but not that of cinchonia.

MONESIA, OR BURANHEM OF BRAZIL.

BY M. VIREY.

Some years ago, M. Bernard Derosne and several other persons, brought this bark, and the extract prepared from it, into some repute, as an active astringent in cases of bloody flux and other humours. The bark is thick, hard, of a uniform brown colour, and heavy; the taste is at first very sweet, afterwards astringent. The brown extract, which is much esteemed in Brazil, possesses the same qualities. The bark has been called by different names, originating no doubt in the different places from which it has been brought. In the Portuguese language it is called *casca dose* (sweet bark), on account of its sweet taste. According to the learned botanist, M. Martius, it is the *mohica*. M. Isidore Bourdon, according to M. Constant Berrier, has ascribed to it the common name of *buranhem*; others have called it *buranhé, gurenhem*, &c. But as it appears that the tree which yields this bark, was observed at the time of the first discovery of Brazil, the name *hivurahê* has also been ascribed to it, cited by Thévet *, in 1558, and *Ibiræe*, of Pisona †, since the description of this tree, given by Jean Bauhin, although imperfect, appears to correspond with it.

This plant, although affording an oblong, plum-shaped, edible fruit, had not been classed, when Velloz, in the *Flora of Rio Janeiro*, placed it in the genus *pometia*, species *lactescens*, on account of its fresh bark being full of a milky juice. Afterwards, Riedel and Guillemin, examining more fully its botanical characters, observed the analogy which it bore to the caïmitiérs, *chrysophyllum*, in the natural family *sapotiliers* of Jussieu.

It only remained to give the precise characters by which this may be distinguished from other species of *chrysophyllum*, thus called on account of the golden yellow hairiness which covers the lower side of the leaves. Casaretti named this species *glycyphlæum*, because it contains a juice, which is at first very sweet and milky. The tree, which is of middle height, and the wood of which is used by carpenters, grows in the forests of Corcovado and other places near Rio Janeiro. It belongs to the Linnæan class, and order *Pentandria monogynia*. It has a monopetalous corolla with five divisions, regular, axillary, yellow, and small; which is succeeded by an oblong, smooth berry, containing four flattened, horny seeds, the oily kernels of which are used as a vermifuge. The leaves are oblong, petiolated, glabrous, glossy above and opaque on the under side.

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* In his *Singularitez de la France Antarctiqae*. Folio. Paris.

† *Historia Naturalis Braziliæ*.

Although there are some points which still remain to be cleared up respecting this vegetable, as the fruit should be edible, and its taste resemble that of the *caîmite* apple, or the *macoucou* of Guyana, the blue fruit of Martinique, yet there are facts enough to identify the source of the monesia, and to complete the notice given of it by M. Guibourt, *in the Journal de Pharmacie*, tome xxv., p. 710.—*Journal de Pharmacie.*

ON DIGITALIS PURPUREA.

The substance of a paper read before the Medico-Botanical Society.

BY DR. HOULTON.

The author observed, that in order to advance medical botany, a branch of science still in a very imperfect state, nature must be carefully studied; nature is rich in facts, and facts are the stuff that truth is made of. He had frequently brought before the society the results of his own observations; how far they were original he was not able to state—many of them he had not found in books. He did not wish any one to place implicit confidence in his statements, but to compare them with nature, and then to receive or reject them. His aim was to forward the grand and beneficent objects of the society. The doctor said it was an article of his medical faith, that a correct knowledge of plants is the first step towards their due administration as remedial agents, a principle he feared not sufficiently felt and acknowledged.

> "Medicus notiâ plantæ destitutus de viribus
> ejusdem nonquam justé judicavit."—*Linn. Matt. Med.*

Opinions are very discordant respecting the medicinal powers of Digitalis purpurea; this, he believes, arises, in a great measure, from the want of uniform preparations of the plant. Authors may not have satisfied themselves, properly, that they have given it a fair trial; that they have not only employed the true plant, but also that all other circumstances have been duly attended to, that are essential to their obtaining from it an effective medicine. Dr. Houlton considered it very probable that the ancient physicians employed this plant, but we have no information respecting their opinions of its medicinal virtues, nor is the plant mentioned by them. It is figured in Gerard, and was considered by him to be an expectorant and deobstruent, about the year 1600. In the Pharmacopœia Bateana, 1706, edited by Dr. Salmon, there is a formula for aqua digitalis. The editor states, that he cured some consumptive people by the syrup of fox-glove administered in this water. About the middle of the last century, it was employed by the surgeons of the Worcester Infirmary in the form of cataplasms and ointment, for scrofula, &c. It was formerly in popular use as an external remedy in some diseases of the scalp. Murray, in the *Apparatus Medicaminum*, 1776, states, that though it is not in the London Pharmacopœia, yet it is more employed in England than in any other country. It is not mentioned by Alston, who wrote in 1770, nor by Bergius, who wrote in 1778. Dr. Withering, it appears, was the first writer who brought the plant fully under the notice of the profession; he observed that it was an ingredient in a nostrum (for the cure of dropsy) that had been purchased; he ascertained that it had been employed successfully in that disease by irregular practitioners in Yorkshire. The doctor's knowledge of botany led him to detect the active part of the secret remedy, and it shows how important a practical knowledge of botany is to the physician, and also how desirable it is that the popular remedies of this country should be scientifically examined.

Digitalis purpurea is in the list of simples of the edition, 1668, of the London Pharmacopœia, and in that of 1720. It was rejected by the framers of that of 1745; it was re-admitted in the Pharmacopœia of 1788, after an

exile of forty-three years; it was not honoured by any formula until 1809, when we first had a tincture and an infusion, and the medicine was thus formally introduced to the profession. Dr. Houlton had witnessed its employment in dropsy, consumption, and pneumonia extensively, some years previously to this period; it was then very much employed, but at the present time, so far as his observation extends, practitioners do not place much reliance upon it: it has the character of being an uncertain medicine; the fact is, we are not at present aware of all the circumstances which modify its action—the uncertainty is in ourselves, not in the medicine. A satisfactory description of the plant he cannot find in any of the works on botany and materia medica, except so far as class, order, and genus. With regard to species and variety there remains something to be done. Digitalis purpurea is in the class didynamia, order angiospermia, natural order luridæ of Linnæus, scrophulariaceæ of Lindley. This beautiful plant, bearing large pendant purple flowers, is indigenous, and grows abundantly in many parts of this country, but is said not to be found wild in Suffolk, Norfolk, or Cambridgeshire; its favourite habitat is a dry, elevated situation. It has not been well described by authors: it has been said to have a knotty and fibrous root. Dr. Houlton has never seen it with a knotty root; if such is sometimes the case, it is rare. The stem, footstalk, and under-surface of the leaves of the true digitalis purpurea have a purple tinge; in some specimens the leaf is purple throughout; the purple colour of the stem has not, so far as Dr. Houlton has read, been mentioned by authors, yet it is a most important character, as there is a purple flowering variety without any shade of purple on the stem or leaves. There is also a white flowering variety; this has no purple tinge about it. The lower leaves of digitalis are said to be in tufts; this is certainly seldom the case; as this is a biennial plant it might be supposed that it would be easy to distinguish the first from the second year's leaves. Two figures were given for this purpose in the *Pharmaceutical Journal*, vol. i., but quite inadequate to the purpose for which they were intended; the leaves of the different years' growth are not to be distinguished by shape; on both plants we find leaves varying from the ovate to the lanceolate shape; the upper leaves of the stem are always lanceolate; a practised eye can always distinguish these different leaves, but it is difficult to give any sufficient rules on this point. If detached leaves are brought with a strip of the bark of the stem attached to the footstalks, they are second year's leaves, there being no stem in their first year; the first year's leaves are, or were, usually brought to market in tufts, from being attached to the crown of the root, the fibrous parts of which were usually removed by the collectors. It is of importance to know that the first year's leaves are of considerable size when the second year's plant is in perfection. This is not the case with some biennials, as hyoscyamus niger, of which we cannot procure the first and second year's leaves at the same period, in their natural mode of growth.

The parts to be employed in medicine named by authors, are the root, flowers, and seeds. Should any one wish to employ the root, the rule Dr. Houlton has given on various other occasions should be borne in mind, namely, the roots of biennial plants are to be collected in the autumn or winter of the first year of their duration; this rule he has never seen in any book, but it is an absolute one. Dr. Withering mentions, that Dr. Crowley, of Cambridge, was cured empirically of hydrothorax by the root, after regular practice had failed. The leaves of this plant, like the leaves of all biennials, should be gathered in the second year of their duration, and as soon as possible after the first flowers have expanded. The plant with a purplish stem should be selected; the leaves, after removing the midrib should be carefully dried, without the aid of artificial heat: no rule is needed for the collecting of the flowers and seeds. In a work of distinguished rank it is asserted, that as digitalis is a biennial plant, its fresh leaves may be procured at any season of the year. Now this is not from its being a biennial

merely, but from the circumstance of its being a very hardy biennial. The leaves of biennial plants die in the winter; in mild winters and in sheltered situations the leaves of digitalis will remain through the winter.

Leaves have been offered for sale as digitalis, which were those of verbascum nigrum; they have much of the general appearance of digitalis leaves, and might deceive the unwary; other species of verbascum have leaves somewhat similar to those of digitalis.

The usual preparations of the leaf are the powder, tincture. infusion, fluid juice, and extract. Dr. Houlton thinks no others are needed than the powder and the tincture, for the more simple we keep our vegetable Pharmaceutical preparations the better. It is worth noticing the changes that have taken place in the preparations of the tincture and infusion in the present Pharmacopœia; they are both weaker than in the former Pharmacopœias. The relative strength of the two tinctures is as 8 is to 10, and that of the infusion as $8\frac{1}{2}$ is to 21—here is a great difference; it is important to bear this in mind, when we compare the practice of authors who wrote previously to 1836 with those who have written since. The infusion of the present Edinburgh Pharmacopœia is double the strength of that of the London. The opinions of authors as to the dose of this medicine are curiously different. The ordinary dose of the tincture, according to those who are accounted the best authorities, is from ten to forty minims. Dr. Pereira states, he has frequently given a drachm of the tincture of the best quality three times a-day for a fortnight, without observing any marked effect. He adds, "I know that some practitioners employ it in much larger doses, as an ounce or half an ounce, with much less effect than might be imagined." Dr. Pereira also states, that Mr. King, of Saxmundham, in Suffolk, gives from half an ounce to an ounce of the tincture in some cases with decided advantage; and that he, Mr. King, has given as much as two drachms to a child nine months old. Mr. King lives in Suffolk, a county in which we are informed the plant does not grow. He would like to know something of the history of Mr. King's tincture. Dr. Houlton would not advise any one to try such doses, prepared after the plan proposed in this paper, that is, from the genuine purple-stalked digitalis. He has seen very unpleasant effects from ordinary doses, when continued several days, and is inclined to believe that the discrepancies amongst authors, in reference to the dose of this very important remedy, arise from the want of uniformity in the preparations they employ; hence they write on different things under the same names, and discordant statements are the necessary consequence.

EXAMINATION OF THE FERMENTATION TAKING PLACE IN POTATO-LEES.

BY E. A. SCHARLING.

The formation of butyric acid has been observed during the fermentation of various saccharine and amylaceous substances; and a baker at Boras, in Sweden, has recently, by accident, observed that the refuse of potatoes kept in a moist state in a moderate temperature, undergoes the same chemical change. He used these lees (by which term we understand the mass remaining in the sieve after rubbing down potatoes on a grater, and washing with water) in the preparation of bread. I examined this substance, and found fermentation to take place, accompanied by the formation of butyric acid. To obtain the latter in a pure state, I dropped a solution of carbonate of soda on the lees before allowing them to ferment; after the lapse of sixty hours I poured dilute sulphuric acid on a portion of the substance under examination, and obtained a powerful odour of butyric acid. I now stirred the whole mass in cold water, filtered, and evaporated the

solution. By spirit, the butyrate and a little acetate of soda were dissolved. A portion of this solution was now evaporated, and the salts obtained were subjected to distillation with dilute sulphuric acid. An aqueous solution of butyric acid passed over, a few drops swimming even on the surface in the form of oil, the remainder of the alcoholic solution was subjected to distillation with sulphuric acid, when a fluid of agreeable odour was obtained, resembling that of rum.—*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

EXPERIMENTS WITH STARCH.

BY E. A. SCHARLING.

BERZELIUS says, "That paste is not to be considered as a solution of starch in water, but merely as a swelling of the particles in water, which they absorb; and again give up, if laid on a porous mass having a greater affinity for water." The winter of 1840 being very severe at Copenhagen, many articles of food were frozen, and confirmed the truth of Berzelius' assertion in my mind. According to Vogel's statement, I expected a portion of the starch to be thrown down in the form of powder from a frozen solution on thawing; but I observed that this result is not obtained in a quantity of sago soup which was casually exposed to the frost. The whole of it was separated into two portions, *viz.* a spongy coagulum and a clear solution. The firm portion I removed with my hands, pressed it out, and obtained a spongy mass, which imbibed water like sponge; under the microscope it appeared to consist of small capsules; when dried it resembled horn; whereas common starch, boiled to paste and frozen, yielded, when dry, a mass resembling wetted paper dried by pressure; a spongy appearance was only obtained when the starch had been boiled for a lengthened period in water. The filtered solution contained starch in large quantity, as was readily proved by iodine. The spongy mass was washed with water until the water expressed gave no further traces of starch with iodine; but on boiling it and exposing it again to frost the clear solution was again rendered blue by iodine, and the same result was obtained on repeating the experiment several times. Thus it would appear that the capsules of starch may be gradually chemically dissolved by continued boiling. Elementary analysis of starch separated by freezing a solution, gave the same result as the analysis of common starch.—*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

A SIMPLE APPARATUS FOR GIVING THE STICK-FORM TO PHOSPHORUS.

BY KARL SEUBERT.

(*With a Cut.*)

Since phosphorus has become an article in great request in commerce a cheap and efficient mode of forming it in sticks is a great desideratum. An improvement on the old system was the more necessary, as the glass tubes, into which the phosphorus was poured, to solidify, were frequently broken in forcing the phosphorus out by means of wires, and this method was moreover attended with a great loss of time. To remedy this evil, the writer employs the following apparatus, of which we submit a description to the notice of the manufacturer:—The melted phosphorus flows from a copper receiver into horizontal glass tubes, the one extremity of each tube being surrounded by warm water (above 111° Fahr.), the other by cold water. The phosphorus when solid is removed from the tube, and thus makes room for a fresh supply, which again solidifies so that a stick of any length may be formed.

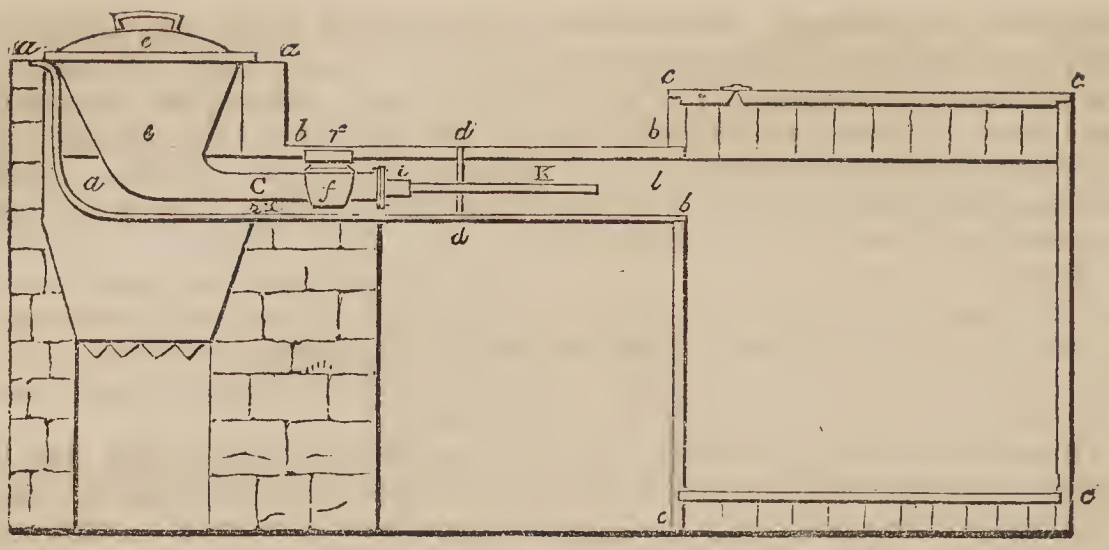

Fig. 1.

The apparatus itself, fig. 1., consists of a small copper boiler (*a*) immersed in brick-work and heated from below; on the right of the boiler is a horizontal canal (*b*), likewise of copper but open at the top, the further extremity of which opens into a cistern (*c*): the canal is divided into two compartments by a moveable partition (*d*), through which the abovementioned tubes pass. The boiler (*a*) contains a second vessel of copper, tinned (*e*), resembling a funnel in shape with a horizontal tube and furnished with a metallic-cock (*f*), the horizontal section of which is represented at fig. 2.

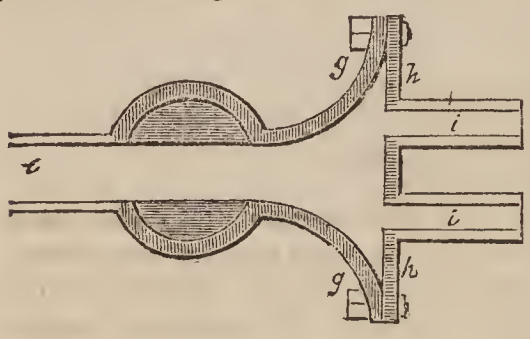

Fig. 2.

A copper-plate (*h*) is screwed tightly on the wide aperture of the cock (*gg*); it is furnished with two perforations to receive two copper tubes (*ii*), about two inches in length, into these two glass tubes (*k*), about one foot in length are inserted.

The cistern (*c*) serves the purpose of a depôt for the sticks of phosphorus when formed, and is furnished with a cover to exclude the light and prevent the phosphorus becoming yellow.

In manufacturing the sticks the cock (*f*) is closed, and the vessel (*e*) filled with water and pieces of phosphorus which are melted by heating the water-bath (*a*). The manipulator sits in the unoccupied space between the cistern and the wall, so that the canal about reaches his chest. By suddenly opening the cock and closing it, a small quantity of phosphorus passes through the glass tubes into the cold water (*ll*) and closes them. The rough piece of phosphorus projecting from the tubes forms an excellent handle, whereby to draw the sticks out. After this commencement the cock is left open, and the phosphorus drawn alternately from either tube, cut off with a pair of strong scissors and let drop into the cistern. Fifteen or twenty pounds of phosphorus—the contents of the funnel (*e*)—may thus be converted into well-shaped and well-coloured sticks in less than a quarter of an hour, by two workmen only.—*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

VALERIANATE OF QUININE.

BY PRINCE LOUIS L. BONAPARTE.

The most convenient method for the preparation of this salt, is the following: Into an alcoholic and concentrated solution of quinine, some valerianic acid is poured in slight excess, which may be ascertained by

means of turmeric paper ; the alcoholic solution of the valerianate is diluted with about twice its volume of distilled water. The mixture is well shaken, and subjected to evaporation at a gentle stove heat, which must not exceed 122° Fahr. When a considerable part of the alcohol has evaporated, the valerianate begins to crystallize in beautiful octohedral crystals, which increase from day to day, and which form but a single mass when the evaporation of the liquid is completed.

Whatever be the method employed in this preparation, we should avoid too great heat, as that might cause oleaginous drops of the fused valerianate to separate from the liquid. However, we might readily transform these drops into crystals, by dissolving them in alcohol, by adding water, and evaporating the whole at a very moderate heat.

If we are not very particular about the chemical purity of this salt, it might be prepared according to Professor Peratte's method by double decomposition ; for this purpose, the ordinary sulphate of quinine is employed (which, however, should be rendered neutral by adding sulphuric acid) and valerianate of lime, both being dissolved in weak alcohol. For the sake of economy, valerianate of lime, obtained by saturating with lime the water distilled from valerian might be employed. The salt of lime thus obtained being never very pure, is consequently never well adapted to yield the best valerianate of quinine. It could only become so by numerous crystallizations. In order to obtain pure valerianate of lime, it is necessary to have recourse to the saturation of the pure acid with lime ; but then it will be better to prepare the valerianate of quinine more promptly by the direct saturation of the acid with the base.—*Journal de Chemie Médicale.*

VALERIANATE OF ZINC.

BY PRINCE LOUIS L. BONAPARTE.

Among the valerianates which I have prepared for medical use, and recommended for clinical study, that of zinc has hitherto more particularly merited the attention of medical men. Berzelius, in the last edition of his *Treatise on Chemistry*, has described this compound in these terms, " a salt crystallized in scales similar to those of boracic acid unchangeable in the air, fusible without any change at 284° Fahr., soluble in water and in alcohol. I have several times prepared this salt, and in order to obtain it with the characters enumerated by Berzelius, the best mode of preparation consists in saturating an aqueous solution of pure valerianic acid with the recently precipitated combination of carbonate and hydrate of zinc. The saturation must be accomplished by the help of heat, and for this purpose, we cause the liquid which is either neutral or slightly acid to evaporate at a very moderate stove temperature not exceeding 122° Fahr.

With these precautions we obtain a salt crystallized in beautiful scales ; some importance should be attached to this form, which serves as a distinctive character for this salt of zinc, and for that of cadmium, the only ones among the known valerianates which crystallize in scales. The valerianate of cadmium, which I was the first to describe, very closely resembles that of zinc in its crystalline form. It is, however, less shining, *cæteris paribus* the size of the crystals is greater, and it has a greater tendency to crystallization.—*Journal de Chemie Médicale*, June, 1843.

M. Muratori has shown that this salt is also obtained by double decomposition. by treating the valerianate of lime with sulphate of zinc, filtering, and causing the liquid to evaporate ; by employing the process above described, viz., that suggested by L. Bonaparte, *a pure product* is obtained,

the only one which should be used for medical purposes. According to M. Cerulli, this therapeutic agent is employed in diseases of the nervous system, and is given in the dose of seven centigrammes and a half daily, in two pills, which are to be taken just at the accession. M. Cerulli states that he has obtained success by employing this remedy.—*Journal de Chemie Médicale*, May, 1844.

CAMPHOR A PRODUCT OF THE ACTION OF NITRIC ACID ON AMBER.

BY O. DOEPPING.

On distilling pieces of amber with nitric acid, evaporating the solution obtained, and re-distilling and re-evaporating several times, small crystals of succinic acid are formed, which may be rendered pure by boiling with nitric acid and by re-crystallization. The contents of the receiver in the first distillation are of a greenish-blue colour, which gradually disappears, and then the fluid is not to be distinguished from dilute nitric acid in flavour or appearance. If this acid be neutralized by a solution of caustic potash, it becomes hot; and when the acid odour has disappeared, a powerful smell of camphor is evolved. If the fluid, when cool, be shaken with ether, and poured into a flask, where the ether may separate, and be drawn off by a syphon, a crystalline residue will be obtained on evaporation, which resembles the camphor of Laurus Camphora in all its physical qualities.—*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

ON THE PREPARATION OF CARBONATE OF LITHIA.

In a recent number we pointed out the utility, according to M. Ure, of the carbonate of lithia as a solvent for calculi in the bladder; and as one of our correspondents has requested to be informed how this salt is prepared, we proceed to comply with his request.

Lithia, from which the carbonate is made, was discovered by M. Arfwedson, a Swedish chemist, in the *petalite* found at Uton, in Sweden; it also exists in the *triphane* found in the same locality. To prepare the salt, the mineral containing the lithia is first to be porphyrized, and then calcined in a platinum crucible, with five times its weight of pure nitrate of barytes. The product of the calcination is to be immersed in from fifteen to twenty times its weight of water, and hydrochloric acid added in excess, which entirely dissolves it. Evaporate the solution to dryness; treat the residue with water acidulated with hydrochloric acid, and filter to separate the silica. Into the filtered solution pour sulphuric acid in excess, to throw down the barytes; saturate the liquor, from which the sulphate of barytes has been separated, with ammonia, which throws down the alumina; and the liquor containing sulphate of lithia with some ammoniacal salts, is to be evaporated to dryness, and calcined so as to drive off the ammoniacal salts.

The residue, which consists of sulphate of lithia, is to be treated with water, the solution filtered, concentrated, and precipitated with carbonate of soda. The precipitate should be washed with a very small quantity of water.

Carbonate of lithia is found in solution in some mineral waters, and more especially in those of Bohemia; it is also found in some of the mineral waters in France. We can readily understand, therefore, the cause of the advantage derived from these waters in the treatment of patients affected with gravel, as well as those troubled with calculi of the bladder.—*Journal de Chemie Médicale.*

ON A NEW AND INFALLIBLE METHOD OF DETECTING ARSENIC,

And of determining the Quantity of it in cases of poisoning by that Mineral.

BY DR. R. FRESENIUS AND DR. L. V. BABO.

At the meeting of naturalists at Mayence, in September, 1842, the Chemists and Pharmaceutists made one of their chief pursuits the discovery of a new test for arsenic, and issued a series of questions to determine this point. The question which we have undertaken to answer is the following:—"Which is the best method of detecting arsenic in the contents of the stomach, mixed with food, &c., when no arsenious acid has been found in substance?" The answer, according to the programme, must embrace the adjoined conditions:

a. Detection of arsenic in whatever form it may exist.

b. Not only detection of arsenic but of other poisonous substances, at least of the metallic poisons.

c. Exclusion of the possibility of a mistake.

d. Detection of the smallest possible quantity of arsenic.

e. Determination of the quantity of arsenic present.

f. The most simple means for attaining these objects.

The view we have taken of the question, and the various conditions, entail upon us the necessity of, first, obtaining from the mixture under examination, a clear fluid containing all the arsenic, and indeed fitted for further analysis; precluding, at the same time, the possibility of the introduction of other metals, which may have been given as poison, into the solution; secondly, of separating the arsenic in the most perfect form; thirdly, of reducing the preparation of arsenic to its metallic state without loss, and without the possibility of deception; fourthly, of proving the metal obtained to be metallic arsenic in the best manner; fifthly, of showing in how far a determination of the quantity of arsenic present is possible, and the best method of proceeding. It would be encroaching too far upon the limits of this journal to give the full explanation of the arguments by which we arrive at our proceeding, but we will at once progress to the description of our method.

A. DECOLORATION AND SOLUTION.

Place two-thirds of the substance to be analysed in a spacious porcelain capsule or basin (reserving the remainder in a well-stopped bottle for unforeseen contingencies), to which add as much pure concentrated muriatic acid as is equivalent to the weight of the solid substances in the mixture, and sufficient water to convert the whole into a thin pap. Heat the basin in a water-bath; and add, at short intervals, about half a drachm of chlorate of potash each time to the hot liquid, whilst stirring it, until the whole becomes of a bright yellow colour, perfectly homogeneous and fluid: two drachms of chlorate of potash are now to be added, and the basin removed from the water-bath. When perfectly cool, the contents are to be filtered through muslin, and the residue washed with hot water, until the solution passing through the filter ceases to react as an acid, when the water used in the washing is to be added to the filtered solution. Evaporate now the whole fluid in a water-bath to the weight of one pound (during which operation the liquor, in general, changes its colour from bright yellow to brown), and add to the remaining acid fluid, whilst stirring it, a saturated solution of sulphurous acid in water, until the odour of the latter predominates, and then heat for about one hour, until the excess of sulphurous acid is again driven off.

B. SEPARATION OF THE ARSENIC IN THE FORM OF SULPHURET OF ARSENICUM.

Place the solution thus obtained (sect. *A*) in a beaker glass, and pass a stream of washed sulphuretted hydrogen, for twelve hours, slowly through

it ; wash the gas conducting tube with solution of ammonia, and add the ammoniacal solution to the fluid in the beaker glass, and place the beaker glass with its contents, covered with bibulous paper, in a moderately warm temperature (86° Fahr), until the odour of the sulphuretted hydrogen has perfectly disappeared. Collect the precipitate thus obtained on a filter, and wash it.

C. PURIFICATION OF THE SULPHURET OF ARSENICUM THUS OBTAINED.

Dry the precipitate (sect. *B*) which contains, in addition to organic substances, all the arsenic in the form of a sulphuret, and possibly other metallic sulphurets, in a porcelain cup over a water-bath, and drop on it fuming nitric acid until the whole is moist ; then again evaporate over a water-bath to dryness. To the residue add pure warmed hydrated sulphuric acid, until the whole becomes equally moist, and heat for two or three hours over a water-bath, and afterwards by augmented heat (not exceeding 302° F.), over a sand-bath, until the carbonized mass assumes a friable character. The residue is now treated with distilled water in a water-bath, filtered, and washed with hot distilled water until the drops passing through the filter cease to show an acid re-action. The water employed in the washing is to be added to the filtered liquor.

D. DETERMINATION OF THE WEIGHT OF THE SULPHURET OF ARSENICUM.

Mix the clear fluid obtained (in sect. *C*) with hydrochloric acid, and precipitate carefully with sulphuretted hydrogen, according to sect *B* ; filter the precipitate obtained, when the fluid has ceased to emit the odour of sulphuretted hydrogen, on a very small filter ; wash it carefully, and pour over the filter a solution of ammonia ; wash the filter with diluted ammonia as long as any thing is taken up ; evaporate the ammoniacal solution in a small porcelain cup, the weight of which has been previously ascertained over a water-bath; dry the residue, at 212° Fahr., until it no longer loses weight, and then weigh it. If the residue, on reduction to the metallic state, prove to consist of sulphuret of arsenic only, 0.803 arsenious acid, or 0.609 metallic arsenic, must be reckoned for 1.000 of the sulphuret. If a residue remain on the filter, insoluble in ammonia, it must be tested for lead, copper, &c. Lead, tin, and mercury may be contained in the carbonaceous residue of sect. *C*, which must consequently be carefully examined.

E. THE REDUCTION OF THE SULPHURET OF ARSENICUM TO THE METALLIC STATE.

As the separation of the metallic arsenic from the sulphuret is the keystone of the whole process, it requires to be effected with the greatest care. We use for this purpose the apparatus, fig. 1.

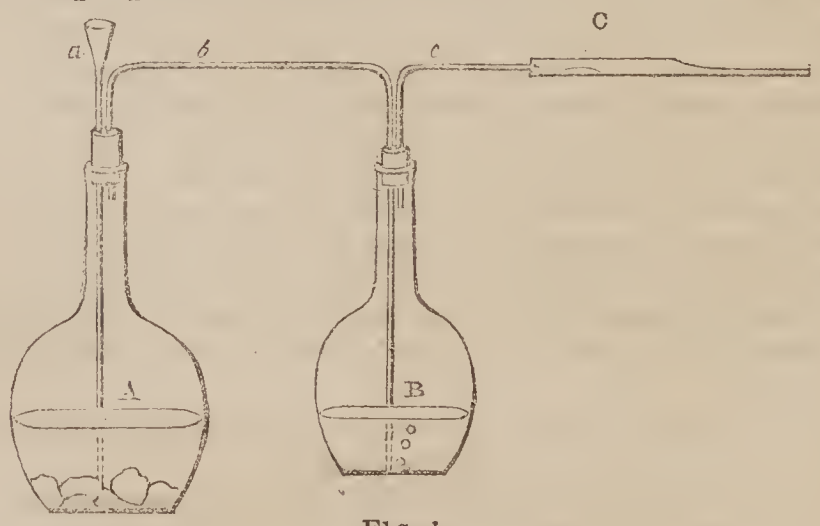

Fig. 1.

The flask, *A*, in which carbonic acid gas is formed, is half filled with water and pieces of marble (not chalk). Through one opening of the doubly-perforated cork a funnel-shaped tube, *a*, passes nearly to the bottom. Through the second opening a tube, *b*, conveys the gas into the receiver *B*, where it is washed and dried in hydrated sulphuric acid (oil of vitriol). The tube, *c*, conducts the carbonic acid into the reduction-tube *C*, represented in fig. 2. It should consist of difficultly fusible glass.

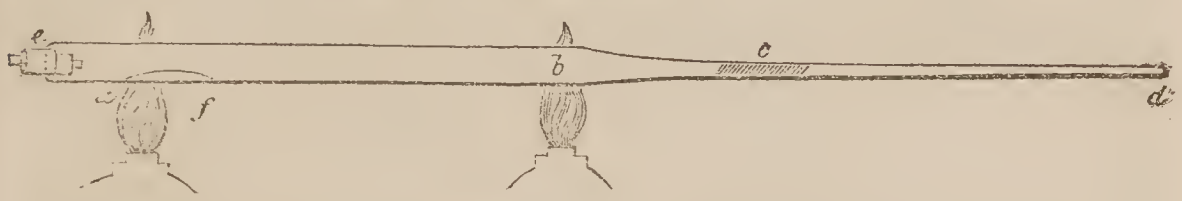

Fig. 2.

The porcelain capsule containing the sulphuret of arsenic (*vide* sect. *D*) is to be again weighed. One-third of the contents is to be removed, placed on a watch-glass, and its weight determined ; whilst the capsule containing the remaining two-thirds is to be carefully reserved. The portion for reduction is to be now rubbed down in a heated agate mortar, with twelve parts of a mixture, consisting of three parts of dry carbonate of soda and one part of cyanide of potassium (prepared after Liebig's plan). The well-mixed powder is to be placed on a piece of smooth paper, and introduced into the tube *C*, as far as *f* ; the mixture will thus occupy the space, *a f*, of the tube *C*, without encroaching on any other part.

The tube being thus charged, is attached by means of the cork *e*, to the apparatus for generating carbonic acid, into which muriatic acid is now passed through the funnel-shaped tube, until a moderate stream of carbonic acid gas is emitted. The mixture must now be carefully dried by heating the tube in its whole extent with a small spirit lamp. When every trace of water has disappeared from the tube, and the gas passes at regular intervals of one second through the sulphuric acid, the portion *b* is to be heated to a red heat by means of a spirit lamp, and the mixture is now to be heated with a second lamp from *a* to *f*, until all the arsenicum is driven off.

The arsenic thus reduced to a metal adheres at *c*, as a metallic crust, whilst an exceedingly small portion escapes at *d*, emitting the odour of garlic. The second lamp is now passed on slowly to *b*, and thus all the arsenic which may have adhered to the wide portion of the tube is driven towards *c*. The tube is now closed at its apex by melting it, and the metallic incrustation driven from *d* to *c*, where it presents itself with a beautiful metallic lustre ; the tube is now cut off at *f*, hermetically sealed and delivered to the authorities. The remainder of the sulphuret of arsenic, one-third of which was used in the reduction, should be sealed in a glass tube and delivered to the authorities also. If sulphuret of tin or antimony were mixed with the sulphuret of arsenic, the metals would be obtained in the reguline state by dissolving out the residue contained in the reduction tube (antimony would also be found in the solution). Their presence must be determined by the usual methods. The weight of the whole residue contained in the porcelain capsule must then be calculated, and the amount of the corresponding sulphuret subtracted from the total weight of the residue. The remainder will be the quantity of sulphuret of arsenic corresponding with the metallic arsenic obtained.—*Annalen der Chemie und Pharmacie*, Band xlix., Heft 3.

CHEMICAL EXAMINATION OF RHUBARB ROOT.

BY DR. I. SCHLOSSBERGER, AND DR. O. DOEPPING.

LITERATURE.*

Trommsdorff, *Journal der Pharmacie*, iii., 1, p. 106.—Schrader, *Berl. Jahrbücher*. 1807. P. 123.—Pfaff, *Syst. der Mat. Med.*, iii., p. 23, u. vi., p. 308.—[N. E.] Henry [*Bulletin de Pharmacie*, vi., and] Trommsdorff's *Journal*, xxiv., 2, p. 88.—[W. T. Brande, *Quarterly Journal of Science*, vol. x., p. 288. 1821.]—Hornemann, *Berl. Jahrb.* 1822. P. 252.—Meissner, *Trommsdorff's n. J.* vi., 1, p. 295.—Runge, *Materialien zur Phytologie*, 2te. Liefer, p. 217.—Peretti, *Journ. d. Pharmac.*, xiv., p. 536.—Ridolphi, *Schweigger's Journ.*, xxxii., p. 490.—Nani, *Biblioth. Univ.*, xxxiii., p. 232.—Carpenter, *Kastn. Arch.*, viii., p. 294.—[*Philadelphia Journal of Pharmacy*, vol. i., page 139.]—Vaudin, *Ann. de Chim.*, xxxiv., p. 199.—Buchner u. Herberger, *Repert.* 1831. P. 337.—[Lucae, *Pharm. Central-Blatt für* 1834, p. 78.]—Geiger, *Annal. d. Pharm.*, Bd. viii., p. 47.—Geiger, *Annal. d. Pharm.*, Bd. ix., p. 91.—Brandes, *Annal. d. Pharm.*, Bd. ix., p. 85.—Jonas, *Archiv. der Pharm.*, IIte. Reihe, Bd. ix., p. 245.—Dulk, *Arch. d. Pharm.*, IIte. Reihe, Bd. xvii., p. 26.—Brandes u. Leber, *Arch. d. Pharm.*, IIte. Reihe, Bd. xvii., p. 42.—[O.] Henry [*Journ. de Pharm.*, xxii., p. 402, and] *Pharm. Central-Blatt.* 1836. P. 631.

The literature of pharmacy is very rich in works on the composition of rhubarb, and yet not one satisfactory analysis is to be met with. We have endeavoured to classify the productions on this subject so as to afford a review of the results of the labours of the various Chemists in this branch.

A. Investigations, the principal object of which was the discovery of *one* or *more peculiar constituents of rhubarb*, by which the *medicinally active principle* might be obtained in a *pure* and concentrated form.

These may be again subdivided into five heads :

1. *Mixtures* which were regarded as the *isolated active and chemical principle* of rhubarb. By a peculiar fatality, which seems to have attended all the analyses of rhubarb, we find that every new Chemist, in examining the various substances obtained by his predecessors, and named by them with every possible variety of distortion of the words Rheum and Rhubarb, proves these pseudo-principles to be compounds of various substances. We will begin with the *peculiar matter of rhubarb* (rharbarbestoff), Trommsdorff, and the *rhubarb-bitter* of Pfaff, substances extracted by spirit from an evaporated aqueous solution, and described as a dark brown mass with unpleasant nauseating smell and bitter taste. Peretti proved the existence of resin and colouring matter, and Buchner and Herberger completed the refutation of this fallacy by proving resin, rhabarberine, sugar of starch, extractive matter, &c., in Pfaff's bitter principle of rhubarb. Henry reversed the experiments of the former Chemists, and obtained his extract by spirit, and then washed with water. The rhabarberine which he obtained distinguished itself from that of Pfaff by its insolubility in water. The purity of Henry's principle, is, according to his own experiments, more than doubtful, and according to the examination of Hornemann and Buchner, the presence of tannic acid, resins, &c., as impurities, is certain. Hornemann succeeded in obtaining, by means of ether, a yellow substance from Pfaff's so-called rhabarberine, which he named *Rheumine*, and of which we shall

[* In order to render the above table, of the literature of the chemistry of rhubarb, as complete as possible, we have supplied certain deficiencies in the author's original one. Our additions are contained within brackets.—Ed. Pharm. Journal.]

speak hereafter (§ 5). Buchner and Herberger conducted a comparative analysis of the *radix rhei* and *radix lapathi* in the year 1834, and mention a compound, called *rhubarb-bitter*, which they obtained from an etherial extract by means of spirit, and which is doubtless a mixture of resins, colouring matter, extractive, &c. Geiger and Brandes, aware of the defects of all prior analyses, undertook the examination of this substance, and as they endeavour to show that the colouring matter is the chief constituent of rhubarb, we shall speak of their experiments again under § 4, although we must mention them here as having paved the way to those of Dulk. The *rheine* which the latter mentions, and which we obtained by the process he describes, appears to us likewise to be a mixture of colouring matter, resins, and extractive.

2. Researches whose object was to discover the peculiar (chemical and pharmacodynamical) principle of rhubarb in an *organic base*. These were of course a consequence of the search after alkaloids, which followed upon Sertuerner's splendid discoveries, and thus Ridolfi, Nani, and others, pretend to have discovered a saline base in rhubarb. Ridolfi advises to precipitate an alcoholic solution with sugar of lead, filter and purify with sulphuretted hydrogen, then to boil with magnesia, evaporate and dissolve the residue with ether which extracts the alkaloid, and a little colouring matter. We pass over other methods adopted by Nani, Runge, and Carpenter, as all subsequent experiments to obtain an organic basis, gave a negative result, and proved the so-called alkaloids to be only mixtures of various constituents of rhubarb.

3. Experiments tending to prove rhubarb to be characterized by a *peculiar acid*. Runge, in his Phytology, was the first to start this hypothesis, which Pfaff already proved incorrect. Then Brandes described a *rhabarbic acid*, but in his description and elementary analysis, he evidently confounds a peculiar resin in the rhubarb with the yellow colouring matter, and his various papers show the confusion of terms which at that time existed. Thus Brandes distinguishes his rhabarbic acid from the rheine of Dulk, assuming the former to be a product of oxidation of the latter, whilst at other times he regards rhabarbic acid, rheine, and the yellow colouring matter of rhubarb as identical, and his description of the reaction of rhabarbic acid corresponds with that of the yellow colouring matter of rhubarb, of the *acid* reaction of which we shall have occasion to speak hereafter.

4. Others have presumed the yellow *pigment* to be the peculiar principle of rhubarb. Brandes in some places identifies it with his rhabarbic acid ; but Geiger, who recognised in the *rheumine* of Hornemann the active principle of rhubarb contaminated with fatty matter or wax, on the authority of an experiment performed on a bird, declares the yellow pigment of rhubarb (according to him *rhabarberine*) to be the true active principle, and Jonas endeavoured to confirm the statements of Brandes and Geiger. Dulk believes this colouring matter to be produced by a change of his rheine, explained (?) by the change which extractive matter and colouring matter ordinarily undergoes on exposure to the air.

As regards the *rheine* of Vaudin, it is doubtful whether it is to be regarded as analogous to the true yellow colouring matter of rhubarb, or as a pigment changed by the long action of nitric acid on it. In favour of the latter opinion are the discrepancies in its reaction, *e.g.* it is soluble in spirit with a carmine colour, whilst alkalies only produce a rose colour with it. The so-called rheine, which Geiger obtained by digesting rhubarb during four months in nitric acid, is probably only to be regarded as altered colouring matter, or a product of oxidation, as Dulk presumes.

We obtained by boiling a mixture of the resins (which we shall subsequently describe) with nitric acid, on addition of water, a yellow powder which formed a red combination with alkalies, but in other respects differed from

the yellow colouring matter of rhubarb, and became on drying a resinous brownish mass. The shade of colour of this red combination with alkalies also differs from that of the other constituents of rhubarb, which are likewise reddened by alkalies, and will be described hereafter.

5. Peretti and Henry looked for the essential principle of the rhubarb in its *resins*, but we believe, according to our experiments, that neither they nor any other Chemist have yet succeeded in obtaining the resins in a pure state, a problem which like the study of the resins in general, and their separation from each other in particular, may be reckoned among the difficulties of Chemistry.

(To be continued in our next.)

LETTER FROM SHEFFIELD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sheffield, August, 1844.

Sir,—In the number of the Pharmaceutical Journal for July, I perceive the following amongst the Notices to Correspondents:—

"H. P. N. (Sheffield) wishes for *a cheap* formula for making Tinct. Lupuli from the extract, for a public institution which will not give the price for a genuine tincture!" "Our Correspondent," you remark, "should consult the Managers of the Institution, representing the state of the case, and if they still refuse to give a fair price he should inquire how they wish to have the article adulterated."

Now, Sir, there are only two public medical institutions in Sheffield, with both of which I am officially connected. In neither of these have the managers or governors any thing to do with the ordering of drugs. There is a rule, both at the Infirmary and Dispensary, which places the entire management of this department in the hands of the medical officers.

I am therefore able to state, confidently, that there has never been any attempt made, either by the governors or medical officers of either of these Institutions, to obtain any article at less than the usual selling price. Our desire is to have the best and most genuine drugs the market can afford, and we never object to pay the cost.

I am utterly unable to account for the statement of your Correspondent; but, in order that the stigma which he casts upon "a public institution" may be removed, I write to request that you will announce J. P. N.'s real name and address in your next number, in order that the matter may be investigated. But, if his name should be unknown to you, I should then be obliged if you will adopt such means as you think will be most likely to procure the name of the public institution against which such a serious and disgraceful charge is preferred. I am, Sir, faithfully yours,

Charles F. Favell, M.D.
Physician to the Sheffield General Infirmary and Consulting Physician to the Public Dispensary.

[We trust that the publication of this letter will answer the purpose.—Ed.]

MEDICAL REFORM BILL.

(House of Commons, August 7th.)

Sir James Graham, in his speech on the Medical Bill, which he had prepared to lay before the House, observed, that from an early period there had been legislation in regard to medical practice. Physicians in England now practised under licences from the College of Physicians in London, or by virtue of degrees granted by the Universities of Oxford and Cambridge. In London, and within seven miles of it, the degrees granted by Oxford and

Cambridge were ineffeetual, and eonferred no privileges. In latter times the legislature had confcrred upon the Universities of London and Durham the power of granting degrees, but they were worthless as to legal privileges. For a long time prior to 1800, the College of Surgeons gave the title of Surgeon. In 1800, the charter of George III. was granted, and they still gave the title, but conferred few privileges. In regard to the Apothecaries' Company, he should be sorry to say any thing disparaging of the individuals composing that soeiety, still it must be recollected, that after all, they were a trading body ; and entrance must be obtained into it by apprenticeship, birth, or by almost any mode except by examination as to qualification ; yet no man could practise as an Apothecary in England without being examined by this trading body. The Apothecaries' Act was passed in 1815, and in that Act there was a clause, which considered in regard to the skill, knowledge, and attainments which should be possessed by the great body of medical practitioners in England, appeared utterly indefensible. He alluded to the clause by which no person, who had not been apprenticed five years to an Apothecary, should be qualified for examination. Those five years oceurred exactly at the period of life the most valuable and important for obtaining knowledge. The youth was bound, at about fifteen years old, to an Apothecary, and his opportunities for aequiring general knowledge were very limited, until at twenty or twenty-one he entered upon a more enlarged sphere of action. He was then naturally desirous of turning his profession to aecount, and often, at twenty-one, sought to enter into practice, having passed five of the best years of his life in an Apotheeary's house and shop, cut off, generally speaking, from attending lectures, and from all opportunities of general study and improvement. In the United Kingdom there were sixteen colleges or bodies for granting medical licences. The Right Honourable Baronet here recapitulated the names of these colleges, including the Universities of Oxford and Cambridge, Dublin, Edinburgh, and Glasgow, and the two Universities of Aberdeen; the Colleges of Physicians in London, Edinburgh, and Dublin ; the Colleges of Surgeons in London, Edinburgh, and Dublin, and the Apothecaries' Company in London. Now, it was obvious that without some controlling power these various bodies would be rivals ; and as rivals their tendeney being uncheeked, was to underbid one another. If that underbidding only related to the amount of fees, it might be very well, but the general tendency was to pass students for the purpose of granting lieences or degrees, and as the fees became low, and the standard of knowledge relatively low, the competition became great. In the northern part of the United Kingdom particularly, those degrees had been sold without requiring any examination; and even in regard to this country, the standard of the College of Surgeons in Dublin was higher than in London. As might be expected from the increased facilities of the north, the licences granted to medical practitioners in England were as five out of six granted in Scotland. He felt it his duty to give some explanation of the reasons which induced him to bring forward a measure of this importance. One evil attendant on the practice of medicine was the ineompetency of those who professed to practise it, and the remedy required was to secure to the publie a sufficient degree of knowledge and skill on the part of the praetitioner. But all men were tenacious of life, and when life was endangered there was a natural tendency to fly for suceour to those who held out promises of relief. Henee quaekery attained an influenee over the human mind,

> "For sure the pleasure is as great
> Of being cheated as to cheat."

He did not propose that quaekery should be put down by statute. The object of the present Bill was to amend many of the provisions of the present imperfect law. But to put down quaekery by legislation would be seeking to attain an impossibility. Without attempting, therefore, to suppress quackery, he still thought it was within the seope of a wise legislature to

offer direct encouragement to the able, qualified, and accomplished practitioner. The principle of his measure, therefore, he might state in general terms to be this : he proposed no restriction on private medical practice ; it would be open to every man in the kingdom (to every private individual, if he thought proper), to engage in the practice of medicine. But he thought a wise legislature should offer to the public some certain and accredited guarantee of the fitness, competency, skill, and knowledge of those practitioners who voluntarily submitted themselves to examination; and who, by examination, proved their competency and skill. His principle, therefore, was that none should be eligible to fill a public medical or surgical office, except his qualification had been tested by competent authority. That was to say, none should be prohibited by law from practising medicine, but none should be qualified to fill public surgical or medical situations, except qualified according to the conditions of this Bill. The question then was, what was meant by "public situations ?" His answer to this question was, that he held an office to be public where the choice of the medical attendant did not rest with the patient or any member of his family. Having said thus much, he would now state the provisions of the Bill he wished to introduce. He proposed to repeal all those restrictions in existing Acts of Parliament and charters, which confined the right of practising medicine to particular localities, so that by his measure medical rights depending upon licences and degrees would be uniform throughout the empire ; but at the same time he should re-enact such portions of the existing law as it should be deemed desirable to retain—beginning the work of legislation on the subject of medicine *de novo*. The effect of this would be that all peculiar privileges, all local privileges in England—as contradistinguished from what was the state of the law in Scotland or Ireland, would be swept away. In Scotland licences for practising medicine were granted, although the parties could not practise in England. By the Bill he proposed to introduce, all these exclusive privileges for practising medicine would be abolished. The most important feature, however, of this measure, would be the establishment of a council of health in this metropolis, in direct connection with the executive government, and for whose proceedings the executive government would be more or less responsible. Thus, the present great anomaly of a number of bodies possessing powers capable of being exercised without any responsibility, would be abolished. To this council would be given the power of controlling the examinations of persons seeking qualifications to practise, and also of regulating and equalising the fees to be paid by them. The council of health and of medical education, it was proposed should remain at all times within this metropolis, holding periodical sittings. The council was to consist of *ex-officio* members, and of members to be appointed by the Crown. The *ex-officio* members would be the Regius Professors of Physic of the Universities of Oxford, Cambridge, Dublin, Edinburgh, and Glasgow. These would have seats in the council in right of their professorships. He next proposed that there should be one Physician and one Surgeon, chosen from the Colleges of Physicians and Surgeons respectively in England, Ireland, and Scotland. He had thus enumerated eleven persons who would form part of the council; he then proposed that six others should be appointed by her Majesty, by the advice of her Privy Council. Of these six, if he might presume to give any advice upon the subject, one, at least, should be a physician practising in the rural districts, as contradistinguished from practising in the metropolis, and also one a surgeon, likewise practising in the rural districts. These six members, with the eleven *ex-officio* members, would, together with the Secretary of State for the Home Department for the time being, constitute a board of eighteen. Of the six members to be chosen by the Crown he should propose that one physician and one surgeon should retire annually, but to be re-eligible. He should also propose that any member might resign, and that a member might be dismissed by the Crown for notorious misbehaviour or

unfitness. The council were to appoint one principal secretary, who was to be resident in the metropolis and in constant attendance on the council, and two local secretaries—one for Scotland and one for Ireland—subject to the control of the Secretary of State. To the *ex-officio* members no salary would be given, but to the other members' travelling expenses, from time to time, should be paid, and a moderate salary should be given to them, with the consent of the Treasury. It was proposed that minutes of all their proceedings should be kept by the council. He now came to that which was the real and essential means of control to be exercised by the council over all the sixteen licensing bodies throughout the kingdom. He proposed that a Register should be kept of all physicians and surgeons licensed to practise medicine and surgery, or, in other words, licensed to hold medical appointments in public institutions. This list was to be alphabetical, and published annually. The council of health would, on letters testimonial being granted by any of the sixteen licensing bodies in the country (who would retain the power of examination, though not that of granting degrees), permit the party to be registered, if the council were satisfied with the institution that had granted the licence.

Mr. Wakley—Without examination by the council?

Sir James Graham—Yes. There would be three degrees of licensing; one to the vendors of medicine, another to surgeons, and the third to physicians. He proposed to enact that, with regard to licensing the vendors of medicine, the licensing bodies should have the power to grant that degree to no person under twenty-one years of age. The letters testimonial would be founded upon an examination, both in medicine and surgery, by one or other of the sixteen licensing bodies. With respect to Surgeons, he proposed that the licence to practise in surgery should be issued to no person under the age of twenty-five years; and with respect to Physicians, the age at which a licence could be obtained would be twenty-six years. At these several ages the respective parties might obtain licences to qualify them to be registered, having previously undergone the necessary examination before the licensing bodies. But a person wishing to be registered as a physician who had not been qualified in the manner required, by having graduated in some university, would not be eligible for registration until he had attained the age of forty years, and had been examined by the Royal College of Physicians in England; or in case the application should be made to some of the sixteen licensing bodies, then the Royal College of Physicians should previously grant a special certificate that they had made inquiry as to the circumstances under which the degree had been conferred. Thus facility would be given for the licentiate to register as a surgeon at twenty-five years of age, and as a physician at twenty-six. Therefore, any person so licensed might combine in his own person the two branches of the profession, and might, at twenty-six, be registered both as a surgeon and a physician. He attached great importance to this point, relating, as it did, to what was termed general practice, and which combined the usually separate departments of medicine and surgery—the skill and ability of the party, however, being tested by actual examination. But all these provisions would be quite nugatory, unless some preeautionary measures were taken by the controlling body to insure that the standard of knowledge requisite to obtain a testimonial to be given to the licentiate should be equally, uniformly, and carefully maintained. He, therefore, proposed to give to the council of health the power to inspect the proceedings of those licensing bodies, more especially with respect to their course of examination and the scale of fees received by them. These would be submitted from time to time to the council, and would be regulated by them. The qualifications, therefore, of persons seeking to be registered, would, as far as possible, be uniform throughout the United Kingdom. No university would have the power to grant a licence to those who had not matriculated in that university, and resided there two years, and who had not been examined, and shown that

he possessed a competent knowledge of Latin and Greek. The council would, beyond this, possess the power of refusing to register persons whom they deemed to be deficient in skill and knowledge, notwithstanding that such persons had obtained testimonials from the examining bodies. He had already stated that he did not propose to proceed by penalties, but by inducements. The principle of the measure was, that persons not duly qualified should not be competent to fill certain specified public offices. He would now state what were the offices which he should term public offices. He proposed that no person, after the passing of this Bill, who was not registered by the council of health, should be appointed to any medical or surgical office in any public hospital, prison, infirmary, dispensary, workhouse, or other public institution in the United Kingdom, or any medical or surgical office in the army, navy, or East India Company's service, but he had made a special reservation in favour of natives of India ; no other person appointed by the East India Company would be entitled to take the appointment without a certificate. He also proposed that certain privileges and exemptions, now given by law to the members of the profession generally, should henceforth be confined to medical men who were registered, that they should be exempted from being summoned to serve on juries, or to serve on corporate, parochial, or township offices ; but none who were not registered were to be so exempted, nor would they be competent to give medical evidence in any court of law where the certificate of any medical man was required. He thought this would be found a very effectual inducement to persons to be registered. With respect to persons at present practising, it was not his wish to make it a harsh measure. He therefore proposed to give to those who were now in practice in the United Kingdom a period of twelve months, within which they might apply to be registered, or application might be made, within the period of two years, by persons practising in colonies, on the production to the council of his diploma, licence, or certificate, or such other evidence as should show that, at the time of the passing of this Bill, he was legally entitled to act as a physician, surgeon, or apothecary, in some part of the United Kingdom. He proposed to inflict a penalty of twenty pounds upon any man who practised in a public office without registration. If registered within twelve months, he was to be considered qualified for public appointments. He now proceeded to notice a clause respecting which, he frankly admitted, he felt some hesitation ; it amounted more nearly to a penalty, and it provided that none but registered persons, or those who were qualified before the passing of the Bill, should be entitled to recover at law for medicines, attendance, or advice. He meant it as a warning clause, and he hoped that it would be so understood. Those who falsely pretended to be registered were to be liable to the punishment awarded to those who were guilty of misdemeanor. Having thus gone through the outlines of his proposed Bill, he had only to thank the House for the attention it had paid to what he had stated, and to add, that he left it open to the public to make their own choice of a medical attendant, even if they preferred an unqualified to a registered practitioner. He concluded by moving for leave to bring in his Bill.

Mr. Macaulay rose to second the motion with pleasure. For many reasons it would be improper now to advert to the details of the intended measure, and the Right Honourable Baronet did not, perhaps, mean to pledge himself as to all the provisions he had stated. He brought it forward that it might be considered and discussed out of doors during the recess. As, however, he (Mr. Macauley) had the honour to represent the seat of a great medical school (Edinburgh) he had bestowed some attention on the subject, and regarded it with a lively interest. A law like that about to be introduced ought to abolish all existing anomalies—ought, above all, to destroy the absurd system of apprenticeship, and to extinguish all local privileges connected with medical practice. He believed he could answer for those whom he represented, that the Bill would receive their cordial acquiescence, and

he apprehended that the same feeling would prevail in other bodies of great consideration. He alluded not merely to the medical school of Edinburgh, but to all the colleges of physicians and surgeons. To them the measure would give great satisfaction, and from them it would receive general support.

The question was then put.

Mr. Warburton made some observations upon his own exertions in the cause, and stated his concurrence in the general principles of the measure.

In answer to a question from Mr. Gally Knight,

Sir J. Graham said that he intended to repeal the Apothecaries Act of 1815, and to deprive the Apothecaries Company entirely of exclusive power of licensing general practitioners in medicine. At the same time, a delegation from the Society of Apothecaries would be associated with those from the colleges of physicians and surgeons.

Mr. G. Knight was understood to ask, whether those who compounded medicines would be allowed to prescribe ?

Sir J. Graham observed, that it would be for patients and families to decide whom they call in ; some might place greater confidence in an unregistered, than a registered, practitioner.

Mr. G. Knight considered it a great objection if mere compounders were permitted to prescribe. On the whole, he had no doubt the new law would put the profession on a better footing, but he could not anticipate for it the concurrence of the whole medical body, and many would be disappointed at the character of the council of health. He might express a doubt whether one council would be sufficient for the whole empire, and whether there ought not to be branch councils for Scotland and Ireland.

Mr. Wakley commenced by adverting to the great number of petitions presented from all parts of the kingdom, and from all ranks of the medical profession, praying the legislature for the adoption of a system of representation in the election of the controlling authorities of the various colleges and medical institutions whence the members of the profession have obtained their diplomas and licences. They would, therefore, object strongly to the nomination of a controlling council by the government, and by the very colleges of which they had been complaining for thirty years. It might give some offence out of doors, but he would say that he believed the Right Honourable Baronet was actuated by a desire to put the medical profession on an improved footing. Nevertheless, he would tell the Right Honourable Baronet that he had been earwigged, deceived, and misinformed. The real state of things had been misrepresented by those who had access to him, and the medical profession at large had had no opportunity of representing to him their feelings and wishes. Perhaps, no measure that had ever been introduced, would create out of doors more dissatisfaction than the proposed Bill, and the Right Honourable Baronet must despair of ever being able to pass it. There were not fewer than 30,000 medical men, in cities, towns, and villages, who would all be opposed to it, as it was perfectly irreconcileable with the just claims of the profession, and the demands of the public. No doubt the University of Edinburgh would be in favour of it, since it conferred a privilege upon it ; but the large body of the profession would resist it to the last. The Right Honourable Baronet seemed to like that part of his measure best which gave every man who thought himself competent the right to practise medicine, and on this account the Apothecaries' Act was to be repealed. He (Mr. Wakley) approved of all the Right Honourable Baronet had said on the subject of apprenticing ; but, in order to protect human life and to prevent human suffering, something ought to be done to guard persons against becoming the dupes and victims of profligate and extortionate men, who had no qualifications, yet who did not scruple to set up as medical practitioners. How much more regard was had to the property of the rich than to the lives of the poor might be judged from the fact, that, while anybody was allowed to practise medicine, no

attorney could attempt to practise without authority under a heavy penalty. He gave the Right Honourable Baronet full notice, not indeed, in an offensive tone, that he should feel it his duty to oppose the Bill, when introduced, in every manner the forms of Parliament would allow. He would not do so factiously, but under the sincere conviction that no more injurious measure, as regarded the health of the community and the interests of the medical profession, could have been submitted to Parliament. If there were any body of men entitled to the most respectful consideration, it was that body which had been educated in what the Right Honourable Baronet had truly called the inductive science of medicine. Such men ought to be the best judges of fit persons to form their governing body. The honourable member then proceeded to censure, in strong terms, the new charter granted to the College of Surgeons, especially that part of it which related to the election of the council, and instanced the case of Mr. Brookes, the accomplished anatomist, who had been refused admission, and who had been allowed, in consequence, to perish of starvation. Another instance was that of Mr. Carpue—a more generally-esteemed and warmly beloved man did not exist; he had educated hundreds, and perhaps thousands, but he was not elected on the council of the College of Surgeons, and why? Because he had instructed students at a cheaper rate than the rest of the body, and because he did not belong to hospitals of which they were members; his life and conduct had been marked by purity; he was esteemed by the whole body. It was to the men whose conduct had filled Europe with surprise and disgust, that the Right Honourable Baronet had confided those extraordinary powers of enfranchisement and disfranchisement. By the existing regulations a man was not qualified to be a member of the College of Surgeons unless it were clearly shown that he had not practised midwifery or pharmacy for five years, and, moreover, that he resided within five miles of the Post-office? What did they mean by that? Was the distance that a man resided from the Post-office to be a measure of ability and fitness for membership of the College of Surgeons? It might be that the very man who, probably, had so recently saved the life of a sovereign and a prince might be marked out by the charter and regulations of this college for degradation and exclusion; for the regulations expressly said, that no man should be competent to associate with the council of the college unless he could prove that he had not been disgraced and contaminated by the odious practice of midwifery within the last five years. It was curious that this Bill should come on at this particular time, and after the scene which the Right Honourable Baronet had only yesterday witnessed at the palace of Windsor. Did the Right Honourable Baronet think it right to exclude that branch of the profession of which Dr. W. Hunter, and the father of the present Lord Chief Justice of England, were such distinguished members? The Right Honourable Baronet had been deceived by some one who called himself a "pure" surgeon, which in the profession was understood to mean a person purely ignorant of everything in medicine, except that which related to his own particular department. He (Mr. Wakley) held that it was the paramount duty of that house to prevent any person from practising who was not duly qualified. Why was all this mess and difficulty with respect to medicine? All unqualified persons are prevented from practising as solicitors under severe penalties: what is the case with respect to barristers? A gentleman enters to one of the inns of court: having kept his terms he is then called to the bar, and every person who cannot plead his own cause, in any of the superior courts, must employ one of those qualified gentlemen. The rule and the practice of medicine are to be totally different. Every pretender, quack, and impostor is to be allowed to practise medicine with impunity. The licence required from the Apothecaries' Company had had a great effect in restraining unqualified medical practice, and was a great protection to the public. It was the duty of the Legislature to see that the public was provided with a competent class of medical

practitioners. But this Bill professed to throw the medical profession open, and any one who chose to practise as an Apothecary might do so without stint if this Bill passed into a law. It would inflict the greatest injury on medical practitioners, and would, he believed, lead to the injury and death of hundreds and thousands. He, therefore, entreated the Right Honourable Baronet to reconsider this question; he begged of him to attend to other evidence than that which he obtained at the Home-office, and to listen to the petitions of the medical practitioners themselves, and he was sure that if the Right Honourable Gentleman applied his powerful mind to the subject he would see it in a very different light, and would introduce a very different measure.

Mr. Hawes thought that the honourable member for Finsbury had in some degree gone beyond the subject before them, which really was, whether, they should place on an improved footing the practice of medicine; and then, whether the Government proposed a measure which would accomplish this object. He would only then take the scheme as a whole, he would not go into its details, or into the question as to the charter given to the College of Surgeons, but taking the general outlines of the scheme, he said that it did deserve the general attention of the house, and he would be ready at its future stages to render his humble aid, and to act cordially and sincerely with the right honourable baronet in effecting some great change. He thought that the council was too exclusive, and that there was ground of complaint that the great body of the medical practitioners would not be represented. The registration of the medical body, particularly of the medical students, would be a great improvement. With respect to putting an end to quackery, he was disposed to agree with the Right Honourable Gentleman, that it was better to hold out inducements than to adopt any measures of restraint; still he thought that justice was hardly done to the Apothecaries' Company, who had introduced a very useful improvement in the great body over whom they presided; and he was of opinion that some steps might be taken to continue their Act. That this Bill would be opposed he had no doubt; but he regretted that the honourable member for Finsbury should, before the measure was fully known, have expressed so strongly his opinion against it, and looking to the opposition offered by the honourable member to the two former Bills which had been introduced upon this subject, and his opposition to this, he could not see to what scheme of reform the honourable member would give his aid.

Sir J. Graham briefly replied, and leave was given to bring in the Bill.

OBITUARY.

On Saturday, July the 27th, Dr. Dalton, in the seventy-eighth year of his age.

We had intended to give this month a few incidents and particulars relating to the life of this distinguished philosopher; but are under the necessity of deferring it until our next number.

BOOK RECEIVED.

The Pocket Formulary, *and Synopsis of the British and Foreign Pharmacopœias: comprising standard and approved Formulæ for the Officinal and Extemporaneous Compounds employed in Medical Practice in Great Britain, America, France, Germany, India, &c.* By Henry Beesley. Third Edition. *Corrected, improved, and enlarged. Sherwood, Paternoster Row.* 12mo, pp. 486.

PATENT MEDICINE LICENCE.

Our readers are reminded that the Patent Medicine Licence is required to be renewed on the 1st of September.

TO CORRESPONDENTS.

"An Associate," (London).—A licence is required for the sale of any medicine requiring a stamp, whether patented or not.

Mr. Edwards thinks that we were not sufficiently explicit in referring a Correspondent last month to the Pharmacopœia for the signification of the terms Oj. and Ibj., and observes, that many persons use both terms indiscriminately to represent 16 ozs. [We are well aware that this custom prevails to a considerable extent, although the Pharmacopœia is quite clear on the subject. The change in the value of the octarium has occasioned much of this inconvenience, we have already stated as our opinion, and now repeat it, that the only remedy for the evil is to indicate the quantities in all cases by ounces, thus rendering the ambiguous terms obsolete.]

"A Member" (August 10th).—See the above.

"An Apprentice."—A drop in very few cases corresponds with a minim, we, therefore, doubt the propriety of substituting one for the other. We trust that in course of time the practice of measuring by drops will become obsolete, minims being much more accurate (see vol. i, page 327).

"A Learner" informs us that he has tried the method of silvering glass by the process mentioned in our last number, but failed in the attempt. [We advise him to try again.]

A. P. S. inquires whether the quantity of tincture expressed from the ingredients should be made up to that of the menstruum employed, observing that by the process of displacement the full quantity is obtained. [Decidedly not. It is the chief advantage of the process of displacement, that the portion of tincture is *obtained* which by the other process is *lost in the ingredients*. By making up the quantity with the menstruum, the strength would be reduced.]

T. M. inquires, when "*sodæ subcarb.* 1lb" is ordered of a wholesale druggist, which quality should be sent? [No. 1, of course, unless the party expressly orders No. 2, 3, or 4.]

J. H. C. M.—As a general rule, Chemists ought to avoid if possible giving English translations of prescriptions to patients.

Mr. Maitland (Chester Place, Hyde Park Square) informs us, by way of a caution, that a man in a fustian dress ordered of him a pill and draught to be sent immediately to a neighbouring street, with change for a sovereign. The man met the boy on the way, and, abusing him for delay, attempted to defraud him of the change by offering a counterfeit sovereign. In this case the artifice did not succeed; but

T. A. (Islington) gives us a similar report; adding, that he was done.

A Correspondent (Aug. 12).—(1.) See Stark's Elements of Natural History, vol. ii. p. 15.—(2.) We are not responsible for vague assertions made by other journalists.—(3.) It is impossible for us to predict what events may transpire with reference to Medical Reform within the next three or four years.

R. R.—We intend shortly to insert some general remark on the examination of soils. We recommend Johnston's Lectures on Agricultural Chemistry.

X. Y. Z. Y.—We are not acquainted with any recent work written expressly on surgical instruments, with plates.

Mr. ARNALL has sent the following formula, which, he says, is much used in the neighbourhood of Pontefract. *Linimentum Iodinii*:—

℞ Iodinii, ʒj.
Lin. Saponis Co. ℥i. M.

W. P. SIMONS.—Impure nitrate of ammonia has been sold for making liquid manure for greenhouse plants.

"CAROLUS."—Moxas are used as means of producing counter-irritation, in some cases of sciatica, neuralgia, and other diseases.

"CHEMICUS," (Sherborn.)—(1.) Arsenic may be separated from sulphuric acid by means of sulphuretted hydrogen; see a paper on this subject in the last number of this journal, page 71.—(2). Hydro-fluo-silicic acid may be kept in glass vessels.—(3). The arrangements are completed for the course of Practical Instruction in Pharmacy; see the Synopsis appended to this number.

V. P. M. will find a formula for Cachou Aromatizé in vol. iii, page 191 of this journal.

"A MEMBER" inquires the best method of preparing oxide of silver, and the colour it should have when pure. [A paper on the preparation of a pure oxide will be found in vol. ii, page 724 of this journal. When prepared by the process there given, the colour is black. It may be obtained by precipitation from solution of nitrate of silver with *liquor potassæ*. When thus prepared, the colour is brown. The latter preparation is generally used in medicine.

Mr. STANTIAL will find a formula for marking ink without preparation, in vol. ii, page 535. The other subject alluded to in Mr. Stantial's letter will receive due attention.

"AN ASSOCIATE AND FOUNDER."—(1). The guaiacum in mistura guaiaci will deposit by long standing. — (2). See the Synopsis of the lectures accompanying this number.

A. F. C., (Southampton) inquires (1). How *unguent. anthracokali* should be made? [This preparation has been recommended by a foreign physician, Dr. Polya, as a valuable remedy in herpetic affections. The anthracokali is made by mixing over the fire, in an iron pan, 160 parts of powdered coal, and 192 parts of a very concentrated and boiling solution of potassa. When the mixture is completed, it is removed from the fire, and constantly stirred with a pestle until converted into a black homogeneous mass. The ointment is composed of one part of anthracokali and 30 parts of lard.]—(2). Should liq. plumb. diacet. dilut. be sent out clear? [It is usually a little turbid, even when made with distilled water. It should not be filtered.]

"TEILO."—See the last answer.

M. P. S. inquires how to make oil of a permanent green colour? [We know of no better way than that adopted in making the green oil of elder leaves, which consists in heating the fresh green leaves in oil, over a water-bath, until the leaves become crisp.]

H. CROW.—We think the transposition was justifiable under the circumstances.

"OXYGEN" wishes to be informed of the best method of bleaching tallow without injuring its quality?

A. P. S. has sent us a specimen of *ung. hydr. nitr.* in the preparation of which rape oil was substituted for olive oil. The consistence of the ointment is good, but not so the colour. We think this substitution ought not to be adopted.—We know of no authorised formula for infusion of myrrh

"AMICUS" wishes us to recommend a chip and turned box manufacturer. [Mr. Norris, 15, New Cavendish Street, New North Road, London.]

X. Y. Z. is referred to vol. i., pages 552, 594, 653, for information on the citrates of iron. The particulars respecting the Practical Course of Pharmacy will be found in the Synopsis accompanying this number.

J. R. S. is referred to vol. iii., page 192 of this journal.

J. H. R. will find the required information on Donovan's liquor of hydriodate of arsenic and mercury, in vol. 1., page 425, and vol. 2, pages 469 and 546.

W. C. T. (Frome)—(1.) See vol. 1., page 178 of this journal.—(2.) *Ervalenta* appears to consist principally of molasses, but being a quack preparation, its composition is kept a secret.

W. S. (Lyndhurst) recommends the use of a portion of old mercurial ointment to expedite the process in making fresh ointment. This has been alluded to several times in this journal.

J. N. R.—We take the following formula for fumigating pastiles from *Beesley's Pocket Formulary*, 3d edit., just published : ℞ Benzoin, ℥ij.; Balsam Tolu, ʒiv.; Ladani, ʒj.; Santali Flavi, ʒiv.; Carbon. ppt. ℥vj.; Pot. Nit., ʒij. Mucilaginis Tragac., q. s. Bright's custard powder is made by a private formula, which we have not been able to obtain.

"Warwick."—(1.) No.—(2.) Pereira's Materia Medica does not profess to be a Treatise on Chemistry.—(3.) Graham's Elements of Chemistry.—(4.) Brande's Manual of Pharmacy is not a recent publication.—(5.) It is a good book.—(6.) The Bye-laws of the Society are printed, and distributed to the Members, but not to the Associates.—(7.) See the Synopsis of the Lectures accompanying this number.

"Inimica Injustitiæ."—Members of the Pharmaceutical Society cannot be prohibited from cupping and drawing teeth, although the practice is not encouraged by the Society.

Oj.—Olive oil is sometimes added to cordial ball mass for horses, to prevent its becoming mouldy.

W. B.—*Emplastrum Stibiatum*—Resinous plaster, ℥j.; resin, ʒiv.; Venice turpentine, ʒiij. Melt together; and when nearly cold, add of emetic tartar, in fine powder, ʒj.

S. E.—Ext. Aloes purificatum, P. L., is frequently called Ext. Aloes Aquosum.

P. J. refers to an article in the *Lancet*, for September 29, 1838, on the changes which take place during the cooking of gooseberries. We cannot find such an article.

J. B. (Yorkshire.)—We recommend, in the first place, Murray's English Grammar. Respecting the minor examination, see vol. ii., number viii.

Z. T. H. and another Correspondent (Chatham.) The subject is under the consideration of the Council.

"A Member" (Dudley).—We understand Mr. Clark has recently become a Member.

Mr. Watson (Halifax).—The portion of vol. iii., number v., said to be wanting, was sent, as requested, by post, on the 5th of July, and has just been returned, stamped "Mr. Watson not to be found."

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. IV.—OCTOBER 1st, 1844.

SIR JAMES GRAHAM'S PROPOSED MEDICAL BILL.

On comparing the Bill which occasioned so much discussion about four years ago, with the one now before the public, our readers will perceive that the principles of the two measures are diametrically opposite.

According to the provisions of the former, the practice of Medicine, Surgery, and Pharmacy was restricted to qualified persons in the several departments of the profession, and the definition of the term "Medical Practice," was so stringent, as to press very severely and unjustly upon Chemists and Druggists.

The present Bill contemplates no restrictions in this respect, but opens the door not only to Chemists and Druggists, but to all persons whatsoever, whether educated or not. It places qualified practitioners under certain regulations, which it is supposed will conduce to the welfare and respectability of the profession, but imposes no penalties on those who practise without possessing any qualification at all.

The former Bill, moreover, proposed to subject Chemists and Druggists to examination, which examination was to be conducted by the Apothecaries. The latter takes no cognizance of Pharmacy, but leaves the Chemists unnoticed, uncontrolled as to education, and unrestrained in every respect.

Reverting to the vigorous opposition made by the Chemists against the Bill which was thrown out in 1841, and to the grounds upon which this opposition was offered, it might be supposed that the present Bill, which is so opposite in its character to its predecessor on the points at issue, would be received by that body with general satisfaction. It is probable that some of our Members may congratulate themselves on this result of our labours, and settle down under the idea that nothing remains to be done but to enjoy the benefit of perfect liberty and freedom from restraint.

In these sentiments we cannot unite; for however desirable it may be to extricate ourselves from the annoyance of oppressive restraint, it is no less desirable to enjoy the protection to which we are entitled as competent Pharmaceutists, which implies the proper restraint of those who do not possess our qualification.

We shall not flinch from the position which we took up four years ago in upholding the right of those who are duly qualified in Pharmacy to give such assistance as their knowledge of drugs enables them to furnish to the public in the domestic administration of remedies; but we are not prepared to advocate the principle of "free trade" in medicine to an unlimited extent. One of the objects to which we have always looked forward as a means of raising the character of our own body, is the restraint of those unqualified persons who invade the province of Pharmacy; which restraint is incompatible with the principles of "free trade" as exemplified in the proposed Bill.

We consider it no compliment or advantage to the Chemists as a body to be permitted by law to act without restraint as *medical practitioners*, the same privilege being granted to every quack who thinks proper to deface the walls with his placards, and to every huxter who keeps a chandler's shop. Neither do we anticipate that this privilege, enjoyed under such circumstances, would elevate the character of our body, or benefit us in a pecuniary sense. As *vendors of drugs and chemicals*, and *compounders of prescriptions*, we must always be allowed to give an opinion when interrogated as to the properties, doses, and ordinary mode of employing the various remedies which we prepare. This constitutes a part of our duty, and by a proper attention to it, we are daily instrumental in preventing mischief, by giving the needful precautions to be observed in the use of substances which, though powerful and dangerous if indiscreetly administered, are nevertheless constantly in the hands of the public as domestic remedies. Possessing this knowledge of the properties of drugs, which is absolutely requisite in every dispenser of prescriptions, we are liable occasionally to be applied to on an emergency when a medical man is not at hand, or in trivial cases when a patient is not sufficiently unwell to be disposed

to call in a doctor, and yet feels a little doubt on the subject. As dispensers of medicine, the public expect us to provide simple remedies across the counter occasionally, under such circumstances; and a man who declared his incompetence to do so, would scarcely be entrusted with a prescription, as his customer would consider him a fool.

Thus far what is called "counter practice" must be allowed in obedience to the prejudices of the public, and it is difficult, if not impossible, to define exactly the line beyond which the dispenser ought not to go in this respect. It is no less difficult for a patient to decide whether it is necessary to send for a doctor, and it often happens that the opinion of the Chemist is asked upon this point. When this is the case, a man who is qualified in pharmacy, and who has a character to lose, will naturally feel sensible of the responsibility which he incurs by undertaking to act as a medical man; and the more qualified he is in his own department, the more cautious will he be in running a risk.

The decision must be left, in a certain degree, to the discretion of the Chemist, and the amount of his discretion is likely to be materially increased by improved education, as well as by a rational and friendly intercourse with medical men.

But it does not come within the province of a Chemist to visit patients, to undertake the regular treatment of a case of small-pox, scarlet fever, or other disorder requiring medical skill. Whatever may be the powers or privileges conferred upon us by Act of Parliament, we should gain nothing by becoming to all intents and purposes medical practitioners. On the contrary, this would divert us from our own legitimate office. Pharmacy would be neglected. Instead of sustaining a scientific and respectable character as followers of a profession for which we are duly qualified, we should become a race of irregular practitioners, and in proportion as we gained ground in this department, we should lose it in our own. Moreover, the "privilege" alluded to not being confined to ourselves, but the door being equally open to the whole world, grocers, oilmen, quack doctors, bone-setters, and empirics of every

description, would follow in our train. We might expect an additional supply of "doctor's shops" to start up in every direction, and thus the competition in the drug trade, which is now a source of just complaint, would be greatly increased, and the amount of our remuneration diminished in proportion.

There can be no doubt of the fact, that the most sure and effectual mode of raising the character, improving the position, and in every way promoting the interest of our body, is to raise our qualification in Pharmacy, to introduce a complete and universal system of education, and thus to confer upon our Members a rank which would distinguish them from unqualified persons, and entitle them to the recompense which is the natural result of merit. The foundation of this system is laid in the establishment of the PHARMACEUTICAL SOCIETY, and nothing is required but the sanction of an Act of Parliament to extend the benefit of the system throughout the trade in all parts of the kingdom. As a voluntary Society, we have made considerable progress; a helping hand from the legislature would enable us to do much more. This is what we have a right to expect: on public grounds it cannot justly be refused.

If the government consider it right to bring in a Bill to regulate the medical profession, providing for the education and registration of Physicians and Surgeons, the ostensible motive for bringing in this Bill, is the public good. But supposing all the objects enumerated in the Bill now before us to be attained, supposing every medical man to have conformed to the stipulated conditions, and to possess the most complete knowledge of disease and the art of prescribing, the public would gain but little by this achievement, unless similar precautions had been taken to ensure the correct preparation of the medicine.

A prudent operator takes care to provide himself with the requisite instruments before he attempts to perform an operation. Medicines are the instruments of the physician, and of the surgeon also to a certain extent; and vain are the skill and forethought of the prescriber, unless the dispenser of the prescribed remedy possesses equal skill in his department. We therefore contend, that

any Act of Parliament professing to regulate the medical profession, and making no provision for the proper cultivation of Pharmacy, is not what it professes to be. Nor can we for a moment suppose that it is the intention of Sir James Graham to pass over the Pharmaceutical department altogether. A single clause might be added to the Bill which would supply the deficiency, and place our body, as registered Pharmaceutists, on a similar footing to that of registered Medical men; or another Bill might be framed which would answer the purpose equally well, and which might in some respects be more advantageous. To be placed in this position would be an advance upon our present state; our influence as a body would be increased; and the desire to become registered according to Act of Parliament, would induce many to qualify themselves who might otherwise not think it worth while to take the trouble.

But this result would not extend itself throughout the trade—its efficacy would not be *universal*, so long as the practice of Pharmacy was alike within the reach of registered and unregistered practitioners. We are rather inclined to the opinion, that, in order to ensure the *entire success* of the measure, it would be necessary altogether to prohibit unregistered persons from practising Pharmacy. This, however, would be a departure from the general principle adopted in Sir James Graham's Bill, and a violation of the system of "free trade," on which subject opinions are at issue.

We have no hesitation in expressing the conviction, that not only the Members of the Pharmaceutical Society, but every individual in the trade, is interested in the introduction of a measure which may give to qualified men an advantage over the unqualified; and the greater the amount of restraint imposed on the latter, the more benefit will be enjoyed by the former. The only class of persons who are interested in opposing every kind of restraint are those who possess no kind of qualification.

A few years ago the Chemists in this country might almost have been ranked among this number, as they possessed no *recognised* qualification as educated Chemists, and merely claimed

protection and a preservation of their accustomed privileges as a body of tradesmen. We now stand upon higher ground: we may consider ourselves within the pale of professional respectability—we have laid the foundation of a substantial improvement in our rank, and we are consequently interested in the introduction of such laws as may increase still further the distinction and distance between our body and those below us.

Whatever may be the general sentiments of our Members respecting the new Bill, we must not view it as a complete and settled measure: it has been submitted to the public ostensibly in an imperfect state, in order that its principles may be extensively discussed, and the result made known in time for any salutary modification to be introduced. Whether the Bill will pass in its present form or not, is very doubtful, nor is it absolutely certain that it will pass at all. Those circumstances which have involved the profession for many years in the political agitation of "Medical Reform" to so little purpose, are likely to occasion difficulties in the passing of any bill which may be introduced.

If the Bill should happen to pass, it will not be for want of opposition, but for want of unity among the opponents. The proceedings in various quarters, as reported in the Medical Journals, denote considerable discordance of sentiment, and not a little hostility between the governing bodies at present in power in the profession, and a numerous section of their constituents. It is clear that there are some points in dispute among the members of the profession itself, which must be settled before the body at large can be expected to unite cordially in supporting any measure for the general good.

It is our sincere desire that whenever a Medical Bill passes the Houses of Parliament, it may be one which is calculated to improve, protect, and benefit the whole profession, including, of course, our own department of it. In the attainment of so desirable an object, no obstacle is likely to have so prejudicial an effect as disputes and jealousies among the parties concerned; and in conclusion, we recommend to the serious notice of our friends, as a salutary hint, the 9th chapter of Luke, ver. 34 and 35.

ON A NEW AND MORE EFFICIENT PREPARATION OF CINCHONA BARK.

BY PROFESSOR DONOVAN, OF DUBLIN.

Previously to the discovery of the febrifuge alkaloids, Peruvian bark was prepared in a variety of forms, with a view of separating the woody fibre from the active ingredients, the former of which was disagreeable to the generality of patients. By the splendid discovery of Pelletier and Caventou the object was attained, and practitioners were put in possession of two alkaline bases, one of which, when converted into a sulphate, has been generally employed as the representative of the virtues of cinchona bark. That it is the representative of *all* these virtues has been doubted by many good judges; and it shall be the object of this communication—first, to adduce evidence on this point, and secondly, to describe a preparation of bark which, while it excludes the woody fibre, shall retain all the other constituents, and in a moderate dose exercise all the powers for which cinchona has been so long celebrated.

From the earliest periods of the medical art, bitters have been the chief remedy employed in the cure of intermittent fever. In the time of Dioscorides, chamomile was the bitter to which a preference was given; and from the era of that celebrated physician down to the universal adoption of cinchona, chamomile was the cure for ague. Hoffman and Cullen succeeded with doses of half a drachm or a drachm of the powder, given several times during the intermission. Dr. Pitcairn considered the antiperiodic power of chamomile to be equal to that of cinchona. Other bitters were also employed, and their effect was observed to be greatly aided by astringents. Fordyce and Percival, of Manchester, in consequence used gentian and oak-bark in conjunction. Dr. Cullen, after observing in general that "the effects of bitters are more certainly obtained by their being combined with astringents," says, "I have employed the oak-bark in powder, giving it to the quantity of half a drachm every two or three hours during the intermissions of a fever, and both by itself and joined with chamomile-flowers, have prevented the return of the paroxysms of intermittents."—*Mat. Med.* ii., 38-49.

Dr. Percival says, "Intermittents have been cured by oak-bark and gentian combined, when neither astringents nor bitters separately had any effect."—*Essays* i., 45.—MM. Merat and De Lens observe, "It is chiefly against intermittent fevers that oak-bark has been extolled, either by itself or mixed with indigenous bitters, as adequate to replace cinchona, especially at

the period of the continental blockade, it was an ingredient in many factitious cinchonas."—*Dict. Univ. &c.* v., 386.

It might be owing to the natural combination of bitterness and astringency in chamomile that its success was attributable.

Other natural combinations of this kind proved equally successful. Willow-bark, first shown to contain tannin by Mr. Biggin, along with an intensely bitter principle (salicine), was found by the Rev. E. Stone, who first employed it, to be capable of subduing ague; he having cured about fifty cases with its powder. (*Phil. Trans.* liii.)—The French Royal Academy of Medicine declares, from trial, that 15 decigrammes (=22½ English grains) will cut short an intermittent fever; but pure bitters were also known to be efficient. Linnæus reports, that at Surinam the cure of intermittent fevers was effected by quassia, the purest of all bitters, and totally devoid of all astringency. Its powers were discovered by a slave called Quassi, whose name is thus perpetuated.

From all the preceding statements and facts, it appears to have been an opinion admitted on all hands, that bitters by themselves, and astringents by themselves, are often adequate to the cure of intermittent fever; but that the combination of both is much more efficient, inasmuch as conjointly they have been found to succeed, when separately they failed. Now, the chief of all antiperiodics, cinchona, is powerfully bitter and astringent; and it is a question do we not, for some purposes, lessen its efficacy by separating from each other the natural principles on which these qualities depend? Dr. Percival, of Manchester, long ago hazarded an opinion on this subject: he observes, that "as the virtues of the bark are strongest in its native state, they depend in all probability on its composition as a mixture, and must of course be impaired by the disuniting of its constituent principles.—*Essays* i., 45.

This supposition is supported by Berzelius and Vauquelin, the former of whom gives his opinion as follows:—"Experience warrants the belief that the alkalies of cinchona bark constitute the active principle. Yet it is very probable that the tannin of cinchona contributes to this action; and we may suppose that tannate of quinina, for example, would be more active than the sulphate or acetate of the same base. I am led to this conjecture by experience of the fact, that cinchona bark, which contains the vegetable alkalies, but not the tannin, is inefficacious against intermittents. There is a law in Sweden by virtue of which every importation of cinchona must be tested with infusion of galls, sulphate of iron, solution of gelatine, and tartar-emetic: and it is proved by an experience of more than sixteen years, that the most efficacious cinchona is that which most abundantly precipitates

gelatine and tartar-emetic; that is to say, which contains most tannin."—*Traité de Chimie* v., 587.

The statement of Berzelius, that those cinchonas which contain no tannin are inefficacious as antiperiodics, must mean that they are so in that quantity which, if the tannin were present, would be effective.

Vauquelin had long before executed a course of experiments on this subject, one of the results of which was, that those barks which, along with the alkaloids, contain tannin, are more efficacious as febrifuges than those which contain the alkaloids alone. —*Annales de Chimie* lix., 113. Accordingly we find the tannate of quinina is always enumerated in the list of therapeutic agents of the French Pharmaciens.

So far of tannin. We now have to inquire, Whether the other constituent principles of cinchona bark are adjuvants to its power. A notion has pretty generally prevailed, that the salts of quinina possess more medical efficacy than those of cinchonina; and many have doubted that the latter exerts any antiperiodic power worthy of notice. This opinion appears to be groundless. Late researches have proved not only the activity of the salts of cinchonina, but have evinced that the alkaloids themselves uncombined with any acid are equal in energy with their salts. Dr. Christison has collected the following facts: "Trials made with it (cinchonina) by Dr. Bardsley in England, as well as by various practitioners of credit in France, Germany, and Italy, seem to leave little doubt that it is scarcely inferior to quinina in the treatment of intermittent fever. And some continentals maintain that, while equally energetic, cinchonina is likewise less apt to disorder the stomach in large doses."

The observations of Elliotson, Nieuwenhuis, Mariani, Bleynie, Dufresne, Herpin de Carouge, &c., confirm the observation of Mège, that these two bases, at least as active as their salts, may replace them with advantage. Bleynie even gives the preference to cinchonina.—*Merat et De Lens*, v., 596.

The next constituent of bark which merits attention, on account of its alleged efficacy as an antiperiodic, is kinic acid. Previously to the discovery of the alkaloids, the insulation of the active ingredient was announced by Deschamp. He obtained it under the form of a crystallized salt, which Vauquelin proved to be kinate of lime. It was employed in the cure of intermittent fever by the medical faculty of Lyons, and was reported to be possessed of such power that no intermittent resisted two doses of thirty-six grains each. The discovery of the alkaloids, however, engrossed altogether the attention of physicians, and rendered them indifferent to the alleged efficacy of kinate of lime, which from that time forth was neglected; as if there may not

exist in cinchona bark as many antiperiodics as there are narcotics in opium.

The base of this salt is of course worthless, and we must refer whatever efficacy it possesses (if any) to the kinic acid. Now, the quinina and cinchonina in Peruvian bark are neutralized by kinic acid; for although tannic acid is present, it may not be in combination with the alkaloids. Some have doubted that kinic acid could possess any antiperiodic power, because it is not bitter. Those who do so must, on the same grounds, doubt the power of the *tasteless* ague-drop, *i. e.*, Fowler's arsenical solution—a medicine of such antiperiodic efficacy that it is always resorted to when bark fails, and it does not often disappoint. Can it be supposed that the reported cures at Lyons were so many delusions? and if not, the kinic acid, in combination with quinina and cinchonina, must afford salts which, being the natural state in which these principles of bark exist, must be doubly energetic.

On this subject MM. Henry and Plisson thus express themselves: "It appears evident to us that physicians ought to employ the natural febrifuge principle of these precious barks (*viz.*, kinates of quinina and cinchonina). An equal quantity of quinina acts more efficaciously when united with kinic acid than with sulphuric, muriatic, or nitric acid, &c.; first, because kinate of quinina exists in Peruvian bark; secondly, because kinic acid, exerting a weaker chemical action on the quinina, ought to retain it more feebly than the above-mentioned acids, and thus present it in its greatest degree of natural energy; thirdly, because kinic acid saturates the febrifuge virtue of the quinina less than sulphuric, muriatic, or nitric acid; fourthly, we do not fear being accused of false judgment in not regarding as altogether improbable, that kinic acid may be more proper than any other to develop the medical action of the quinquina." —*Journ. de Pharm.* xv., 408.

New constituent principles of bark have from time to time been announced, and although the existence of them has been questioned, there seems to be some confusion and contradiction in the matter. Thus, Reuss, of Moscow, discovered what he called Amer-cinchonique, and affirmed it to be the febrifuge principle: Pelletier and Caventou found reason to believe that it is a mixture of cinchonina, kinate of lime, and colouring matter; and if so it is no wonder that it should effect cures. But M. Chomel failed with it even in doses of two ounces, which, if it contained cinchonina, is a singular fact.

Dr. Sertuerner, of Hammeln, brought forward a febrifuge principle derived from cinchona, which he assures us he found to be more powerful than either bark or quinina. This principle he named chinoïdine; and he declares that when both bark and

quinina failed to cure, twenty-four grains of chinoïdine, given in doses of two grains two or three times a day, banished the disease to return no more.—*Journ. de Pharm.* xvi., 47.

This same principle was also obtained and found effective by Ravizza and Casati, of Milan.—(*Annali Univ. de Med., Milan*, 1829.) Yet immediately after MM. Henry and Delondre published experiments which led them to the conclusion, that the chinoïdine of Sertuerner is no more than a mixture of quinina and cinchonina rendered uncrystallizable by a peculiar yellow resinous matter which alters their properties.—*Journ. de Pharm.* xvi., 144.

Shortly after this MM. Henry and Delondre discovered in yellow bark a crystallizable substance which they call *quinidine.* It is excessively bitter, turns syrup of violets green, forms bitter crystallizable salts with acids, and seems to exist in bark combined with an *unknown acid.* They add, that it ought to be found on the bitter uncrystallizable waters during the preparation of sulphate of quinina, "*et y exister dans chinoïdine de Sertuerner, composé plus complexe et impur dont il y a quelques années nous avons, peut-être à tort, doûté de l'existence.*"—(*Ibid.* xix., 623). Thus they in some degree retract their doubts of the separate existence of Sertuerner's febrifuge; and amidst the uncertainty that prevails on the subject of these various agents, can we safely decide that quinina and cinchonina are the only febrifuge principles which the cinchonas contain? It will be sufficient here to advert to the alkaloid said to be discovered by M. Théos, of Naples, in cinchona bark: different from cinchonina and quinina: enough is not at present known of its powers.

Abstracting from all considerations of composition, many eminent physicians declare, as a *fact*, that sulphate of quinina is for many purposes inferior to cinchona; and in order to complete the chain of evidence, it will be necessary to quote their opinions.

Professor Giacomini takes a middle course. He observes, "Since, amongst the proximate principles of Peruvian bark, those which present a very decided and, one might even say, an analogous therapeutic action, are quinina, cinchonina, tannin, and kinic acid, one might propose a mixture of these principles."—*Encyclop. des Sciences Médicales.*

The natural mixture, namely, the cinchona itself, is accordingly in many cases preferred by some excellent judges. Dr. Vulpes, a distinguished physician of Naples, assures us, in a memoir presented to the Academy of Medicine, that in typhus fevers, such as prevail in hospitals, prisons, &c., cinchona bark ought to be preferred to sulphate of quinina. Merat and De Lens add, that in those fevers which accompany certain eruptions, cinchona

bark ought to be preferred if there be a threatening of gangrene, or if the eruptions be surrounded by a livid circle. Dr. Christison says, "It has even been averred that in some endemics of ague and remittent fever, in hot climates, the bark itself has been found effectual, although sulphate of quinina was comparatively inefficacious."—*Dispens.* 336.

Dr. Sertuerner, of Hammeln, speaking of an intermittent fever which appeared in the environs during 1828, in an epidemic form, says, "I availed myself of quinina in their treatment; I ordered it in doses of six to eight grains with acids, but without preventing relapses of the malady; so that the employment of it always appeared to me of very uncertain efficacy. I feared that it was incapable of replacing all the qualities of cinchona. Frequently I was obliged to have recourse to the bark itself, and when this was given in considerable doses, few relapses occurred. Experiments made at the bedside of the sick, induced me to suppose that the cinchonas left, to chemical analysis, some interesting discovery to be yet made."—*Journ. de Pharm.* xvi. 46.

The late Dr. Lendrick, King's Professor of Practice of Medicine in the King and Queen's College of Physicians, replying to some questions of mine, made the following observations in a letter still in my possession. * * * "As to sulphate of quinina, I have scarcely used it, either at Sir Patrick Dun's or Mercer's Hospital, or in private practice, for the last two or three years. In many instances where Peruvian bark usually acts as a specific, sulphate of quinina completely failed, and the treatment afterwards proved successful on other preparations of the cinchona bark being used. How far this circumstance may be attributed to the adulteration of the quinina, or to its not containing, even when pure, the essential principle of the cinchona, I cannot say."

MM. Trousseau and Pidoux have convinced themselves of this capital fact in the history of cinchona, "that in marshy countries, during a period sometimes long-continued, say one, two, or even three months, a patient may experience an almost continuous affection, which presents nothing remarkable except exacerbations nearly regular, and this disease yields completely to cinchona. In the same countries, we meet individuals affected with chronic pleurisy, for example, amongst whom the fever assumes the tertian or double tertian type; and the sulphate of quinina, far from curing in such cases, generally aggravates it."

Various reasons have been assigned by different authorities for preferring the cinchona bark, in many cases, to sulphate of quinina. According to Trousseau and Pidoux "sulphate of quinina is much more irritating than cinchona (in substance) on account of its greater solubility, and on account of the corrective

found in Peruvian bark, namely, the tannin. It also provokes chronic gastritis and diarrhœa much more frequently than cinchona." And again: "If sulphate of quinina less frequently causes vomiting than cinchona in powder, it more frequently provokes diarrhœa."—"This purgative action of sulphate of quinina merits the more serious attention, as the medicine, if it purges, does not exert so energetic a febrifuge action."—"Gastralgies more frequently follow the ingestion of sulphate of quinina than of cinchona."—*Traité, &c.*, ii., 225.

Pereira says, "I have often observed that sulphate of quinina will sometimes irritate the stomach, occasion nausea and pain, and give rise to febrile symptoms, while the infusion of bark is retained without the least uneasiness."—*2d Edit.*, 1408.

Barbier states a striking fact: he says, that in the Hotel-Dieu of Amiens, there being a great number of intermittent fevers during the autumn of 1828, he wished to compare the efficacy of powder of cinchona with that of sulphate of quinina. "The cures were effected as easily with one as the other of these remedies; but we were surprised to find patients who preferred the powder of cinchona to the sulphate of quinine; the bulk of that powder which they were obliged to swallow, its bitterness, and all the disagreeble circumstances of its ingestion, did not deter them. All these inconveniences could not cause them to forget the annoyance, the pains, the heats, the trouble, and the anxiety which the sulphate occasioned in the epigastric region, and which continued a very long time."—*Traité Elémentaire*, i., 376.

A modification of some of the foregoing opinions, adopted by many practitioners of eminence, is that the antiperiodic power of cinchona resides exclusively in the alkaloids, and that all the ingredients conjointly exert the tonic influence of this bark. Beside the antiperiodic property of cinchona, the next important one "is that of being *le premier des toniques*, according to the expression of Barthez, and the most certain perhaps of all those we possess. It is in the assemblage of *all* the principles of cinchona bark that this faculty appears to reside. The cinchona, in order to act as a tonic, ought not to be deprived of its alkaloids, for it is to the union of *all* its elements that the action is attributable. It is on its tonic quality that its stomachic, antiseptic, antigangrenous, anticachectic, antiscorbutic, and antihydropic effects depend. On account of the same property, it is employed in continued and prolonged fever attended by debility, in gouty and rheumatic diseases, obstructions, &c."—*Dict. Univer. de Mat. Med., &c.*, v., 628.

The summary of the opinions conveyed in the above passage, and sanctioned by the high authority of MM. Merat et De Lens,

is, that by far the greater number of the therapeutic effects of cinchona can be rendered available only by the combination of *all* its proximate principles.

With regard to the efficacy of bark in arresting the progress of mortification, whether proceeding from an internal or external cause, if the original cases published by Rushworth, Douglass, Amyand, Stripton, Monro, and others, be admitted to be faithfully recorded, it is hard to account for the scepticism of some, unless it be that the authorities mentioned did not sufficiently discriminate the cases in which it is efficacious, and that the moderns have sometimes employed sulphate of quinina instead of bark in substance. On this subject, Trousseau observes, "Quinina and cinchonina, so powerful as febrifuges, are of little use in these cases [gangrene]; it is very probable that the febrifuge principle is of trivial influence in the antiseptic action of cinchona, and that the latter resides entirely in the tannin."—*Traité de Thérap.* ii., 346.

In concluding this part of the subject, I should observe that the illustrious discoverers of the cinchona alkaloids never entertained the expectation that these precious medicines should altogether supersede the barks in practice. On this point, their original opinions were so much in accordance with those which have been collected in these pages, that I shall give them in the words of their promulgators: "*Nous sommes loin, cependant, de soutenir qu'il ne faut plus employer le quinquina en nature: quand notre opinion sur le principe actif du quinquina serait basée sur les observations médicales les plus nombreuses et les plus avérées, nous ne tiendrons pas ce langage. Nous ne nions pas que les autres principes qui accompagnent le cinchonine dans le quinquina ne puissent modifier son action d'une manière utile et physiologiquement inconnue; mais des modifications à une propriété entraînent l'existence spéciale de cette propriété même.*"—*Pelletier and Caventou's Annales de Chim. et de Phys.* xv., 364.

On considering the facts and opinions adduced, it will probably appear to the reader that sulphate of quinina is not the representative of *all* the virtues of bark. The adoption of the former, in a great measure, to the exclusion of the latter, may have arisen from the want of a preparation of bark comprising, in a small dose, all its active principles. The alcoholic menstruum renders the tincture objectionable. Decoction in water takes up but a small ratio of the active ingredients; cold infusion still less. In the watery extract the proximate principles are said to have undergone injurious changes.

Under the impression that an agreeable preparation containing all the virtues of bark in a small bulk, would be of use, I applied

myself to the consideration of the subject. M. Guérette and others have shown that yellow bark, after it has apparently yielded every soluble ingredient to water, retains more than two-thirds of its alkaloid. I found that it required to be boiled for fifteen minutes, in ten successive portions of water; each portion being eight times the weight of the bark, before the whole bitterness was extracted. But the attempt to concentrate so large a volume of liquid by evaporation, proved that the bitterness and astringency of the resulting liquor were less than what would have been expected: some other method was therefore to be sought.

I accordingly made a tincture of yellow bark with proof-spirit; decanted it, and strongly pressed the residuum: a second tincture was drawn from the residuum in like manner. What remained was boiled thrice successively with small quantities of water; the decoctions being pressed out by the screw-press. The decoctions were evaporated to a small volume; the tinctures were distilled to one-third, which, being now almost a watery solution, was mixed with the decoction.

Further concentration was to be obtained, but without the agency of fire. The liquor, prepared as above, consists of kinate of quinina, tannin, kinate of lime, and some other principles. The kinate of quinina is the most important of all, and by increasing its quantity, we might virtually concentrate the liquor, but for the great expense and trouble of preparing that salt from its constituents. Fortunately there is an easy method of attaining the end, by converting the dikinate of lime, naturally existing in cinchona, into kinate of quinina, by adding oxalate of quinina to the decoction: the oxalic acid seizes on the lime, producing an insoluble oxalate, which precipitates, while the kinic acid and and quinina form the salt required, which remains in solution. Thus the object is easily and completely accomplished.

To obviate the perishable nature of this liquid, it must be converted into a syrup—a form in which the active principles are not only preserved, but some of them are held in solution, which otherwise they would not be; for a highly concentrated decoction of bark, although transparent while hot, is charged with a deposit when cold. But if a sufficiency of sugar be dissolved in it, the syrup remains permanently transparent, and free from deposit.

This syrup, like others that are much loaded with vegetable matter, has a tendency to crystallize; and against this inconvenience I found a remedy in gum-arabic, a portion of which is, therefore, to be used in place of its equivalent in sugar.

In this preparation distilled water must be used, to avoid the waste of oxalate of quinina, which salts of lime, contained in common water, would occasion.

All syrups loaded with vegetable matter are liable to *mothering*;

to keep them in small bottles perfectly full, and in a cold place, is an adequate mode of prevention.

Although quinina exists in bark in the state of dikinate, a portion of that salt is decomposed in the liquid preparations by the tannin present. But bitannate of quinina, a salt insoluble in mere water, is held dissolved in this syrup, as is evident from the intense colour which salts of iron strike with it: the tannic acid contained in bark is of a peculiar kind, and different in its properties from the common.

The following are the quantities of materials to be employed, and the calculations of the result:—

Let eight ounces of yellow bark, in coarse powder, be digested with a pint of proof-spirit for a week, in a close veesel, with frequent agitation. The tincture is to be fully extracted by the screw-press; the residuum is to be digested with another pint of proof-spirit for a week, and the tincture again expressed. The residuum is now to be boiled for half an hour with a pint of water, and the decoction strongly pressed out. The boiling of the residuum a second and third time with a new pint of water is to be performed in the same manner; and then the three decoctions, mixed, are to be evaporated by heat to eight ounces. It will be much the better if this be done in a vacuum. The tinctures, mixed, are to be distilled or evaporated until eight ounces remain; and these, still boiling hot, are to be added to the evaporated decoction. A pint of liquid will thus be produced, the chief ingredient of which is dikinate of quinina. Its quantity may be determined as follows:—

If one French pound (7559 troy grains) of yellow bark furnish, on an average, 200 troy grains of disulphate of quinina, containing 170 grains of anhydrous quinina, this last, while existing in the bark as dikinate of quinina, must have been in combination with 87.4 of kinic acid; the amount of dikinate of quinina in each French pound of yellow bark being thus 157.4 troy grains, or eighty grains in eight troy ounces, namely, the quantity from which the above-mentioned pint of bark liquor was procured.

The other ingredient of which notice is here to be taken, is kinate of lime. The quantity of this in eight ounces of yellow bark, and, therefore, in a pint of bark liquor, will be 268.8 grains, when the bark contains seven per cent. of this salt, as it ought. Now 268.8 grains of hydrous kinate of lime, consist of—

Anhydrous kinic acid	149.73	grains
Lime	24.52	"
Water	94.55	"
	268.8	"

And 24.52 grains of lime require for saturation 31.53 grains of anhydrous oxalic acid, which would be furnished by 315.31 grains of anhydrous dinoxalate of quinina—this last salt consisting of 31.53 grains of anhydrous oxalic acid (equal to 55.17 of crystals), combined with 283.78 of anhydrous quinina.

The result of the double decomposition of 268.79 grains of crystallized kinate of lime, by 315.31 grains of anhydrous dinoxalate of quinina, would therefore be 56.05 grains of insoluble oxalate of lime, and 433.51 grains of anhydrous dikinate of quinina, thus—

Anhydrous kinic acid.	149.73 grains
Anhydrous quinina	283.78 "
	433.51

Thus, by adding 315.31 grains of anhydrous dinoxalate of quinina to the pint of bark liquor above mentioned, containing 268.8 grains of native kinate of lime, we produce 433.51 grains of dikinate of quinina. And as that liquor naturally contained eighty grains, as already shown, the total quantity of dikinate of quinina is now 513.5 grains in the pint of liquor produced from eight ounces of yellow bark.

Having therefore added 315.31 grains of anhydrous dinoxalate of quinina (or rather its component parts, already estimated above) to the pint of bark liquor, and boiled for a few moments, the liquor is to be made into a syrup by adding twenty-one troy ounces of refined sugar, and four ounces of best gum Arabic, both in powder and previously mixed. The whole is to be kept stirring until solution be effected: and if the resulting syrup, when cold, do not amount to thirty-two ounces measure, that quantity is to be obtained by the addition of water. When cold, the syrup is to be filtered through flannel, which is the best filter for syrups; what remains on the filter is inert matter.

In each ounce measure of this syrup, there are sixteen grains of anhydrous dikinate of quinina. To compare this strength with that of common decoction of bark, we have only to consider that, if two ounces of yellow bark be boiled in thirty-two ounces of water, and that the whole dikinate of quinina were thereby extracted, the quantity would amount to but twenty grains, whereas in an equal measure of the syrup there are 513.5 grains—that is, the syrup is twenty-five times stronger than the decoction. But as the whole active matter of the bark is not extracted, the syrup is still stronger. By sweetening the decoction equally to the syrup, the latter being previously diluted with the quantity of water equivalent to that contained in the decoction, I found by the taste that the syrup is about thirty times

more bitter than the decoction. Hence, one drachm of syrup is equal in power to about three ounces and six drachms of the decoction, and to ninety-six grains of the powder.

To facilitate calculation, I have hitherto supposed that *yellow* bark was to be employed for this syrup. It has been already shown in this essay that, in the opinion of good judges, cinchonina is equal to quinina as an antiperiodic. Red bark contains both of these alkaloids often in equal quantities, along with a much greater ratio of that highly important medicinal agent, the peculiar tannin of bark, than is found in the other species. It was, indeed, long ago accounted the best of the barks by Dr. Saunders; and Dr. Skeete proved that it imparted more of its virtues to menstrua than any other. A syrup prepared from red bark will contain all the virtues of the three barks, and perhaps in a greater degree than a syrup made from the other two conjointly: some might prefer a mixture of red and yellow barks in equal quantities.

It remains to offer a few suggestions relative to the pharmaceutical employment of this syrup. In general it may be used in any mixture of compatible liquids, when the powers of bark are required, and when the other liquids are already sufficiently voluminous, and would be altogether too bulky if decoction of bark were employed. Thus, in the simultaneous exhibition of decoctions of bark and sarsaparilla, in equal quantities, the smallest efficient dose of the mixture is six ounces three times a day. By altering the formula to fifteen and a half ounces of decoction of sarsaparilla, and five and a half drachms of syrup of bark, the same powers are exhibited in half the foregoing bulk.

Hitherto there has been no way of exhibiting bark in its full powers, except in the state of powder, which to most persons is so disgusting a dose that it is rarely prescribed. The following contains all its energy in a state of perfect development and activity, and is a pleasant carminative tonic :—

Cinnamon water, six ounces and a half; syrup of bark, half an ounce; compound tincture of bark, an ounce. An ounce measure of this mixture is equivalent to thirty-six grains of bark in substance.

When bark and iron are indicated, the following is the formula in which the least chemical action takes place between the tannin and the iron, as no discoloration appears for several days :—

Precipitated carbonate of iron, syrup of bark, of each an ounce. Mix. Dose, the size of a small nutmeg.

The strength of this syrup is such, that one drachm is a full dose, either by itself or in water. Aromatics, such as anise or fennel, are said perfectly to mask the bitterness of preparations

of quinina. M. Pierquin says, that thirty-two grains of carbonate of magnesia conceals the taste of six grains of sulphate of quinina, without interfering with its virtues.

To conclude, this preparation of bark seems deserving of the attentive consideration of physicians, as it contains all that is valuable in that medicine, in a state of perfect preservation and full energy. It presents the active ingredients exactly in their natural state, which good judges have declared to be in many forms of disease absolutely necessary. It contains nothing but what is an unaltered proximate principle of bark. The form is commodious, not liable to spoiling, is less disagreeable than any other, and may be rendered even agreeable.

11, *Clare Street, Dublin.*

ON THE MEDICINAL PROPERTIES OF THE ARGEMONE MEXICANA AND HURA CREPITANS.

BY WILLIAM HAMILTON, M.B., H.M.L.S.

Among other plants which possess properties of the utmost importance to man, few deserve to rank higher in estimation than the prickly poppy or Mexican thistle (Argemone Mexicana), which grows wild in the greatest profusion throughout the whole of the Carribean islands, and may be found at every season of the year covered with its bright golden blossoms, and bearing its prickly capsules in all their several stages to maturity. This little plant early attracted the attention of the Spanish Conquistadores, who, finding its seeds possess an emetic quality somewhat resembling those of the carduus benedictus of the older pharmacologists, gave it the names of *cardo santo* and *cardo benito*, by which it is yet known in many parts of the South American continent.

The continent of America presents several species of the genus *argemone*, the seeds of which, no doubt, possess, in a greater or less degree, properties similar to those of the A. Mexicana, or yellow thistle, the only species which I have met with, or which is indigenous in the West Indian islands.

The yellow thistle to which, therefore, I shall confine my observations, is an annual plant, attaining a height of about two feet, and abundant by the roadsides among rubbish, and, indeed, in almost every uncultivated spot throughout the lower and hotter parts of the islands. Its stem is round and prickly, furnished with alternate branches and thorny leaves. The whole plant abounds in a yellow milky juice, resembling gamboge in colour, and not improbably possessing properties similar to the seeds.

This juice is one of the ingredients in the composition of the Creole remedy for cancer, which was communicated to the public, through the pages of the *London Medical Journal*, some thirty or forty years ago, by Mr. Affey, a planter of St. Vincent, who gave the following directions for its preparation:

"Mix well together half a pint of yellow thistle juice (A. Mexicana), as much of the milky juice of the French physic nut (Jatropha multifida), one ounce of Castile soap, cut fine, and three ounces of rum. Expose the mixture to the sun till inspissated to a sufficient consistence to be spread upon lint. Before applying this plaster, the diseased part should be bathed well with a decoction of the leaves of the French physic nut."

The milk of the argemone employed in this preparation, acts no doubt as an anodyne in allaying the exquisite pain attendant on the complaint; and its application in other cases of morbid irritation demands a trial.

I am not aware of any experiment having been made to determine the applicability of this juice to internal medicine; but as it most probably partakes of the anodyne and purgative qualities of the seeds, divested possibly of their emetic properties, it would be worth while to procure a portion of the inspissated juice from the West Indies for trial—care being taken to have it collected both in the increase and decrease of the moon, and in each of the four seasons of the year, in order to determine the period of its greatest activity. This yellow milk is probably a natural emulsion of the oil, which is found in the seeds in a detached form.

Besides its application to the cure of cancer, this milk has been employed as a collyrium in some affections of the eyes; and has been suggested by Long as a diuretic in dropsy, and as a lotion in eruptions of the skin. Dr. Barham, as quoted by Lunan in his *Hortus Jamaicensis*, vol. ii., p. 312, says,

"The whole plant is milky, but of a yellow colour; which, mixed with woman's milk, and dropped into the eyes, clears the sight, and takes off spots or films. It may be for this reason that it is called *argemone*. It also wastes funguses or proud flesh. The distilled water, with the tops of wild tamarinds (Acacia arborea), makes a good eye-water. The fruit or head is called *fiego del inferno*, or *ficus infernalis*; and well it may, for it contains seeds enough to send any that should take them wilfully to *inferno*, being much stronger than any opium, as was lately discovered in Jamaica in the following manner:—A negro man, who had run away some time from his master, lived by stealing of stock; one night he came to a sheep-pen, where there was only a poor old negro man to look after it, to whom he said he must have a sheep to-night. The old man, not being able to resist him, gave him good words, and asked him to smoke a pipe, which he filled for him, putting in a quantity of the seeds of this plant; and before he had smoked out his pipe, he fell into a sound sleep, not easily to be awakened: upon which, as the old fellow knew very well the effect, he ran to a neighbouring pen, and getting ropes and assistance, they secured him before he was thoroughly awake; and when he was, he cursed and swore, saying, the old fellow was an Obeah man, and had bewitched him. I saw a fat steer drop down dead of a sudden, fetching two or three staggers, foamed at the mouth, and died

immediately. I ordered them to cut his throat; and after opening him, in his stomach were found several *handfuls* of the seeds of this plant, which I suppose killed him."—*Bar. Hort. Amer.*, p. 152.

After giving this extract from Dr. Barham's work, Lunan proceeds to inform us, that "the late Dr. Affleck, who frequently administered this medicine in the course of his practice with great success, says, in a letter to a friend—

"'Dr. Barham's description of the virtues of the poppy (yellow or prickly poppy, Argemone Mexicana), is different to what I have experienced. About twenty years ago, a gentleman of the faculty had a severe attack of the dry belly-ache; after using several medicines to little purpose, he desired an emulsion to be made with two drachms of the poppy-seed, eight ounces of water, and a little sugar, of which he took a tablespoonful every half-hour; after the third dose, the violent pain and retching abated, the fifth dose brought *on a composed sleep* for two hours, *succeeded by a plentiful evacuation:* about that time the dry belly-ache disappeared. Ever since I have used it in complaints of the bowels, and found it a safe and mild purge, and kept it in the shop under the title of *Papaver Errat. American.*'"

In Nevis the oil was obtained from the bruised seeds by boiling, and sold in small phials, containing about an ounce each, by the negroes, under the name of *thistle oil*, at the price of a quarter-dollar each. The usual dose of this oil was thirty drops upon a lump of sugar, and its effect was perfectly magical, relieving the pain instantaneously, throwing the patient into a profound and refreshing sleep, and in a few hours relieving the bowels gently of their contents. Notwithstanding the abundance of the plant, and the facility of collecting the seed to any extent, the superior facility of procuring, and the greater ease of extracting the oil from the seeds of the common physic nut (Jatropha curcas), which grows in almost every hedge, too frequently led to the adulteration of the thistle oil by its admixture, which communicating to it a drastic and emetic property, led to its disuse. This is an adulteration which can only be guarded against by having the oil extracted from the genuine seeds, recently gathered by confidential persons on the spot, and sent home in carefully closed bottles, secured as much as possible from the action of light and heat. Under these circumstances I have no doubt that the *thistle oil* will prove a most valuable addition to our Materia Medica, and fully compete the palm of utility with the far more costly and far less agreeable oil of the croton.

The seeds, when swallowed whole, are inert; but when bruised, they operate powerfully as emetico-cathartic—a property derived probably from the germ; as is the case with the seeds of the sandbox (Hura crepitans), which, from being extremely pleasant to the taste, are frequently eaten by new comers in their ignorance of their powerfully emetico-cathartic properties. An American captain, however, who traded to the West Indies, and was a man of inquiry and intelligence, told me he found these last seeds a mild

and agreeable aperient, after the removal of the germ or embryo, together with the paper-like membrane enclosing it. Three or four of the seeds so prepared he found sufficient to act gently on the bowels. It is probable that an oil might be obtained from them similar in its operation to the thistle oil. Browne, speaking of them, says, that when roasted, the seeds "purge upwards and downwards. I have tasted one of them," he continues, "and it appeared at first to be both mild and pleasant; but it soon began to warm and scald both my palate and throat, which induces me to look upon it as an improper purgative; unless it be given to raise a warmth in the bowels, where they have lost most of their vigour by a continued flux or diarrhœa; and even then I think the seeds of the argemone a much more eligible medicine."

Lunan, speaking of them, says, "A single seed, or one and a half, is recommended in the dry belly-ache. Henandez directs the seeds to be roasted. The vomiting occasioned by eating these nuts may be checked by giving a strong decoction of columbo root. Mr. A. Robinson says, he ate a kernel of a fresh seed, and in the space of five or six minutes, he grew very sick, and was purged and vomited with great violence. He says, he had several times eaten these kernels before without being in the least affected; but he imagines the difference to have arisen from the seeds he had before eaten being old and dry: from which it would seem that they only operated when in a green state."

I may resume this subject in a future paper.

14, *Octagon, Plymouth,*
Sept. 4th, 1844.

STRENGTH OF COMMERCIAL ACETIC ACID.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having had occasion at various times to examine samples of commercial acetic acid, and having found appreciable and marked difference in their strength, it will not perhaps be regarded as unseasonable or useless, if I detail the result of my experiments. The plan which has been adopted in every case in determining the percentage of real acid, is the one recommended in the Pharmacopœia, and which admits of easy and exact application.

One hundred grains of pure and transparent crystals of carbonate of soda are weighed in an accurate balance, and mixed with water until the solution occupies, in an alkalimeter graduated into 100 parts, exactly the volume of 1000 grains of water. It is obvious that every division in this tube corresponds to ten grains of water, or one grain of crystallized carbonate of soda.

One hundred grains of the acid to be tried are next weighed,

diluted with water, gently heated, and carefully neutralized by the alkaline solution, taking care to stir frequently during the operation. The liquid in the alkalimeter tube must be added until all acid reaction on litmus paper has ceased.

The first sample was tried July 24th, 1843; 100 grains required for saturation 78 grains of carbonate of soda, so that its composition in 100 parts, was

Real Anhydrous Acid.....	27.625
Water	72.375
	100.000

A mixture of 16.6 parts of this acid and 83.4 water, or 1 part acid, and 5 water, would be equal in strength to distilled vinegar, or the best No. 24 malt vinegar.

One hundred grains of the second specimen, tried October 4th, 1843, required for neutralization 76 grains of carbonate of soda, showing that it was composed as follows :—

Real Acid.....	26.562
Water	73.438
	100.000

17.6 parts of this acid, mixed with 82.7 water, would resemble in strength the distilled vinegar, P.L., or in the proportion of one part acid to $4\frac{3}{4}$ parts water.

One hundred grains of the third sample, examined January 22d, 1844, required for saturation 65 grains of carbonate of soda, proving its composition to be,

Real Acid.....	23
Water	77
	100

So that 20 parts of this acid and 80 water, or 1 of the former to 4 of the latter, would form a preparation similar to the distilled vinegar of the Pharmacopœia.

One hundred grains of the fourth sample, examined September 10th, 1844, required for saturation 87 grains of carbonate of soda, so that it is composed of

Anhydrous Acid.....	30.8
Water	69.2
	100.0

and exactly resembles the acidum aceticum P. L.

In every other respect, the samples were equally pure and free from contaminating substances.

The two last samples were procured from respectable vinegar houses in London, and charged the same price, so that there was an actual difference in value of 41 per cent., No. 3 only requiring 4 parts of water, while No. 4 required 5.66 parts to make vinegar containing 4.6 per cent. of real acid.

When the absolute necessity and great value of general chemical knowledge, and its practical and economic applications in ensuring the uniformity of the remedial agents we are called upon to prepare, and the purity of those we find it practicable to purchase from the manufacturer, are insisted upon in the presence of some persons who glory in the appellation of practical men, we are frequently met with the reply, *Cui bono?* What will be the amount of profit—what the amount of pecuniary advantage I shall derive from the acquisition and application of such knowledge? The results of the experiments detailed above, furnish one, amongst innumerable instances of actual pecuniary benefit arising from such application. Here is an absolute saving of 40 per cent.; and without the adoption of this or some similar method of chemical examination, it is impossible to determine the quality and strength of an article like the present.

Specific gravity is not a safe criterion, and cannot be relied upon: and here allow me to suggest the benefit that would accrue both to apprentices and their employers, if the former were engaged occasionally in examining the various articles received into stock. Would not by these means adulteration be detected and prevented, and the duly requisite strength and purity of the medicines in use secured?

Even passing by the exalted and disinterested pleasure derivable from the attainment of knowledge, the confirmation and extension of experimental truths, it must be admitted that a certain portion of chemical information and skill is absolutely essential to the creditable and successful performance of the duties devolving upon Chemists and Druggists. What more effectual check could be given to the sale and circulation of sophisticated drugs, than their invariable examination by every purchaser. If this were made an unalterable rule in the establishment of every Chemist, would not the manufacturer and wholesale dealer, for the sake of their own reputation and interest, be induced to supply genuine articles?—would not the character of our body be raised?—would not a powerful obstruction be offered to any invasion of the boundaries of our profession by unprincipled and uneducated individuals?—would not the confidence of the public and the medical profession be restored and enjoyed?—and would not greater conformity and success be observed in the operation of remedial agents, and thus the principal cause of the variable and contradictory statements made by different practitioners removed?

I am, Sir, yours, very respectfully,

Ashbourn, Sept. 11, 1844. JOHN BAKER.

ON PLATING STEEL BY THE APPLICATION OF A SOLUTION OF SILVER.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It has long been known that when steel is immersed in a solution of sulphate of copper, its surface acquires a coating of the latter metal, and my object in addressing you on the present occasion, is, through the medium of your pages, to communicate a fact of which I find no previous notice, viz., that a similar result may be obtained with silver, instead of copper, by immersing the steel to be coated in a solution of the hyposulphite of silver and soda. This solution, remarkable for its intensely sweet taste, is readily obtained by dissolving recently precipitated chloride of silver in a solution of hyposulphite of soda, and though the steel may be plated, as stated above, by *immersion* in the solution, it will be found more advantageous in practice to use a paste, formed by moistening a little whitening with the solution, with which the surface to be plated should be rubbed over.

It is to be regretted that in some instances the precipitation of the silver on the steel is attended with a roughening of the surface of the latter metal, in other cases, however, the silver deposited presents a perfectly uniform and adhering surface, so that it is hoped, as the process receives more general attention, some means will be devised for obviating the only objection which exists to its immediate and extensive employment in the arts.

It may be observed, that from the deep stain which it imparts to the surface soon after its application, this solution cannot be used for silvering copper or any of its alloys.

The process here described appears the more entitled to the brief notice that has thus been bestowed on it, inasmuch as it seems to have escaped the observation of M. Becquerel in his elaborate memoirs "On the Precipitation of Metals by other Metals," recently published in the *Comptes Rendus*.

I am, Sir, yours respectfully,

Bath, 19*th September*, 1844. Φ.

IMPURITIES OF COMMERCIAL IODINE.

BY THOMAS ANTISELL, ESQ.

At a time when iodine is at so high a price in the market, it is no matter of wonder that it is difficult to obtain it in a state of purity. I have at this moment in my possession some of that

substance largely adulterated, leaving a considerable residuum after being treated with strong spirit.

I boiled this residue with some dilute nitric acid, and, after neutralization, obtained by the usual tests well-marked precipitates containing iron. The whole residual matter treated by the nitric acid was not taken up, and the insoluble portion appeared to be fine sand.

Having taken another portion of the iodine and heated it over a spirit-lamp in a capsule, after having driven off all violet vapours, a dark coloured mass, small in quantity, remained, which, when transferred into a small crucible, was burnt away completely, without any violet vapour. This was carbon. The adulterations then expressed in their relative quantity were—Iron, Sand, Charcoal.

NOTE ON THE TESTS FOR THE PRESENCE OF LIME IN THE PREPARATIONS OF MAGNESIA.

BY MR. RICHARD PHILLIPS, JUN.

When magnesia is adulterated, carbonate of lime is, I believe, the substance usually employed; and it is, therefore, of great importance to Chemists to have some ready test for its presence.

In the notes of the Pharmacopœia it is stated, that in order to ascertain if carbonate of lime be present, bicarbonate of potash is to be added to a solution of magnesia in hydrochloric acid, it precipitating the lime, but not the magnesia. Now, although it is true, that if a large quantity of lime be present a greater part of it will be precipitated, still some will be redissolved by the carbonic acid liberated, which of course renders this test useless as a quantitative one.

The usual quantitative test employed, is to add to the solution containing the chlorides, caustic and hydrochlorate of ammonia and then oxalate of ammonia—an oxalate of lime being precipitated. Although this is a very exact process, the whole of the lime being precipitated, it is not a very ready one for the practical Chemist; and another objection to it is, that oxalate of lime varies in the quantity of water it contains, according to the temperature at which it is dried.

In the last process hydrochlorate of ammonia is mentioned as being present; and it is necessary on this account, that it has the power of preventing the precipitation of magnesia by ammonia.

In the same manner hydrochlorate of ammonia will prevent the precipitation of magnesia by carbonate of potash, and, in fact, this process for the separation was some years ago proposed,

but it was objected to on this account, that a part of the magnesia was precipitated with the lime. This objection might, I conceived be overcome by gently heating the mixture, as hydrochlorate of ammonia, if in excess, would then redissolve any magnesia precipitated, and in order to try if this were the case, one part of chloride of magnesium was mixed with 100 parts of chloride of calcium, and then the hydrochlorate of ammonia, and afterwards the carbonate of potash, the mixture was very gently heated, the lime was precipitated, and the magnesia was found to have been still held in solution by the usual test of phosphate of soda, ammonia being first added.

This would, therefore, appear to be the simplest which can be adopted by the Pharmaceutical Chemist, as all that he has to do is, to a solution of the magnesia in hydrochloric acid to add hydrochlorate of ammonia and carbonate of potash, and gently to heat the mixture; and the only precaution necessary is, that the hydrochlorate of ammonia be in excess.

In the same manner, if ammonia and hydrochlorate of ammonia be first added to a solution of the chlorides of magnesium and calcium, bicarbonate of potash may be employed to precipitate the lime, the ammonia decomposing the bicarbonate of lime formed into carbonate; the precipitate must however be allowed to stand for four or five hours, and be frequently stirred. And I mention this, as it has been stated by Dr. Daubeny, that carbonate of potash carries down a portion of the magnesia along with the lime, even if hydrochlorate of ammonia be present, whilst the bicarbonate does not, but I consider that the reason the carbonate of magnesia was precipitated is on account of the precipitate not having been heated with the hydrochlorate of ammonia.

Craig's Court, Sept. 20th.

ON THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—My attention has been drawn to the observations made in two letters of your last number, signed a "Druggist," and "M.P.S.," denouncing the sale of poisonous drugs by Chemists, and suggesting a course of conduct, which if carried out, your Correspondents would (were they Country Druggists) soon find their businesses considerably diminished.

If, Sir, we are, according to your Correspondent's *very nice notions of humanity*, to refuse supplying "on any pretence whatever, or to any person, however well known the applicant may be to the party applied to for it, laudanum, prussic acid, sugar of lead, crow-fig, syrup of poppies, oxalic acid," &c., as your Correspondents recommend, we should, indeed, make a serious inroad upon our returns; for had your Correspondents lived in a manu-

facturing district, they would find that most of these preparations are no small articles of consumption; in fact, they are daily purchased by parties who are fully conversant with the medicinal properties they possess; and those truly lamentable cases where the administration of them has proved fatal (which is always deeply to be regretted), are but very isolated, compared with the daily enormous amount of good done to our population by the judicious use of such-like drugs.

For my own part, I always give explicit directions to parties purchasing such drugs; make full inquiry about the use they are intended for; caution them as to their fatal effects, invariably mark the article Poison, and having done so, I consider I have done my duty; but the principle of refusing to supply them at all, is, in my opinion, ridiculous. If we commence with the above, we must in equal justice to the public add one hundred more deleterious drugs to the list; and then we should require but very few Druggists to supply the wants of the public.

But, Sir, as long as such works as *Buchan's Domestic Medicine*, *The Doctor*, *The Physician*, *Every Man his own Doctor*, &c., are published and sold amongst the lower classes, which foolish works give them a sort of *semi-knowledge* of the use of a few drugs, your Correspondents will find these things regularly asked for. As regards the sale of arsenic, oil of vitriol, sulphate of copper, &c., *which we could not refuse to supply to the public*, I fear (were your Correspondents located in an agricultural district) their over cautious motives of humanity would be somewhat agitated at a customer's asking for twenty-eight pounds of arsenic, wrapped in two ounce packets (which is commonly bought by farmers to mix with wheat, previous to sowing, to prevent what is commonly termed the *smut*); or a person wanting one pint of spirits of vitriol, which is also commonly given to horses; in these cases, I should suppose, from the tenour of your Correspondent's letter, *they* would not supply the articles; in fact, I should think they would be quite horrified to hear of a Country Druggist retailing four gallons of syrup of poppies weekly, which I know to be the case. In fine, Sir, all these are daily articles of consumption in the country, and were your Correspondents and Country Druggists to follow out the principles suggested, they would indeed put a stop to the administration of a number of truly valuable preparations.

In conclusion, I cannot close these remarks without reverting to an increasing dictatorial spirit of the London Druggists in frequently offering uncharitable and foolish observations, through the Society, respecting what Country Druggists *should or should not* sell to the public, inasmuch, Sir, as they are, in my opinion, generally ignorant of the nature of the Provincial Drug Trade, therefore, their remarks are the more ungenerous; because, it is well known by parties who have left London and purchased country establishments, what great difficulties *they* have had to surmount in getting into the routine of the country mode of doing business: I also much regret seeing this spirit of interfering with the modes in which members *should and do* conduct their businesses, somewhat fostered by the Society; because it appears to me to reflect *ungenerously* upon the competency and judgment of members supporting the Society, at the expense of the views of a few who are evidently ignorant of the subjects they take up, and whose suggestions are rarely of any utility, or given with that courtesy to their brethren which is likely to be acted upon.

I remain, Sir, your obedient Servant,

Sept. 5, 1844. A Country Member.

ON THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I beg to inform your Correspondent who complains of the Leicester Chemists for selling arsenic so indiscriminately, that in three of the cases the arsenic was purchased at a small shop in the outskirts of the town, and not of a respectable Chemist. I know that those girls who poisoned the old woman, about two years since, applied to two or three respectable shops, and were very properly refused. I hope, Sir, for the credit of the respectable Chemists of Leicester, you will insert this in your Journal,

And oblige, Sir, your obedient Servant,

Aylesbury, Sept. 5th, 1844. A. U. A.

EXTRACTED ARTICLES.

ADULTERATION OF WAX WITH STEARIC ACID,

BY M. C. REGNARD.

The manufacture of stearic acid having now increased to a considerable amount in France, and its price, at the same time, having fallen very much, the result has been that several manufacturers of wax have attempted to adulterate the latter substance by the former. The physical properties of stearic acid being rather similar to that of wax, have caused persons to imagine that no great mischief would arise from this ; this idea is probably true enough when the wax is destined for domestic use, but this does not hold true when it comes to be employed by the pharmacien. Hence it is that we have thought it our duty to publish the results of some experiments which we have undertaken with the view of detecting these adulterations.

All our experiments were made with wax of which we could guarantee the purity, as well as with wax mixed by us with a small quantity of stearic acid. We shall confine ourselves here to the mentioning of those attempts only which led to a satisfactory result, as those we would recommend to the reader.

If, after having boiled a small quantity of wax mixed with stearic acid in distilled water, we allow it to cool, the wax mixed with the acid forms a mass and floats on the surface of the liquid. This then possesses the property of reddening turmeric paper. Pure wax did not yield the same result.

We mention this fact without attaching much importance to it, for we know that in certain countries sulphuric acid is employed in the bleaching of wax, and with such wax one would be led into a very great error, if the means now mentioned were employed. The best reagent for detecting the presence of stearic acid is lime water ; the process is conducted in the following manner :—

We take a small glass ball, the neck of which is secured by a tight cork stopper, and surmounted by a tube which is tapering and small at its upper extremity ; we then put lime water into the ball, with the substance for examination, after having divided it into as thin flakes as possible. Heat is now rapidly applied.

If the wax is pure, the lime water remains transparent, if not, it soon loses both its transparence and its property of restoring the blue colour of reddened turmeric paper ; it here forms a perceptible dulness, and a white deposit which is insoluble, *stearate of lime.* For the sake of greater certainty, this salt may be again collected, and tested by its characteristic properties. Another reagent which we might mention here is liquid ammonia.

If wax be pounded in a mortar with ammonia, the liquid becomes turbid if the wax contain stearic acid—in this case stearate of ammonia forms ; but as this salt is soluble, the turbidness does not appear ; for which reason we give the preference to the lime water.—*Journal de Chimie Médicale*, June, 1844.

PHENOMENA RESULTING FROM KEEPING PHOSPHORUS IN WATER.

BY M. ALPH. DUPASQUIER.

1. When phosphorus is *perfectly pure*, it can become coloured only under the influence of light ; but its purity does not prevent it from becoming more or less opaque on the surface, by being gradually covered with a crust, which in this case is *white*, without a shade of yellow or brown, and without a horny appearance. This crust, consisting, according to M. Pelouze, of hydrate of phosphorus, is constantly formed, according to the observation of MM. Coiquet, phosphorus manufacturers, in spring water, well water, or river water, which contain salts of lime.

In distilled water, on the contrary, the pure phosphorus, when perfectly protected and sheltered from the luminous rays and the atmospheric air, seems to retain its transparence with its whiteness for an indefinite length of time. But this will not be the case if the air which is in contact with the water can be renewed, and especially if this liquid, instead of having been distilled, contains calcareous salts. Such at least are the results of experiments and observations made by the skilful manufacturers just now mentioned, and which they were so kind as to communicate to me.

The last remark inclined me to think that the hydrate in the whitish crust of the phosphorus might be combined with a calcareous salt ; but the researches which I have made to satisfy myself on that point, and which consisted in dissolving in nitric acid some scrapings obtained from the opaque part of a perfectly white portion of phosphorus, and then to try by reagents whether lime was present in this solution, enabled me to discover but some traces merely of this base. It would be impossible for me then, for the present, to explain the important difference presented by common water and distilled water with respect to the formation of the opaque crust of the phosphorus kept in them, perhaps it is because the former are more aerated.

The preceding remarks will not, however, be entirely devoid of utility ; they tend to prove that the preservation of phosphorus requires not only that it be kept from the action of the solar light, but also that it be immersed *in distilled water, sheltered as much as possible from contact with the atmospheric air.*

2. Phosphorus immersed in water at the common temperature, exerts in time a decomposing action on this liquid, and effects its acidification, and at the same time a slow and imperceptible disengagement of phosphuretted hydrogen. This decomposing action seems to be exerted with energy under the influence of the direct solar light ; under that of diffused light, this action still continues, but takes place slowly. The following fact proves that it continues even in *the most complete darkness.* When phosphorus is allowed to remain for a length of time covered with water in tin boxes, where it is usually inclosed for the purpose of removal, the air contained in these boxes by a lid perfectly soldered, *becomes explosive.* If an attempt be then made to open the box by unsoldering its lid with an iron heated a very little above a red heat, the gas imprisoned in the box immediately takes fire, and gives rise to a detonation which bursts the vessel, and sometimes even causes the phosphorus to be projected to some distance*. This phenomenon is evidently the result of the mixture of an inflammable gas with air, and this gas cannot be pure hydrogen, for it inflames only at a red heat ; it must then be phosphuretted hydrogen, a gas which requires a much less heat to inflame.—*Comptes Rendus*, No. 7, August, 1844.

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* In order to avoid accidents, boxes of phosphorus should be opened, not by means of a hot iron, but merely with a chisel.

ON THE ANALYSIS OF GUANO.

BY ANDREW URE, M.D., F.R.S., &c.

(*From the Journal of the Royal Agricultural Society of England.*)

This extraordinary excrementitious deposit of certain sea-fowls, which occurs in immense quantities upon some parts of the coasts of Peru, Bolivia, and Africa, has lately become an object of great commercial enterprise, and of intense interest to our agricultural world. Four or five years ago, it was exhibited and talked of merely as a natural curiosity. No one could then have imagined that in a short period it would be imported from the coasts of the Pacific in such abundance, and at such a moderate price, as to cheer by its fertilizing powers the languid and depressed spirits of the farmers throughout the United Kingdom. Such, however, is now the result, as attested by the concurring Reports of almost all the Agricultural Societies of Great Britain and Ireland. No less than 28,500 tons of guano have been already imported from Peru and Bolivia, 1500 from Chile, and 7000 from Africa, altogether 37,000 tons, while more is on the way. The store of it, laid up from time immemorial in the above localities, seems to be quite inexhaustible; especially since it is receiving constant accessions from myriads of cormorants, flamingos, cranes, &c.

Having been much occupied with the chemical analyses of guano during the last two years, for Messrs. Gibbs, of London, and Messrs. Myers, of Liverpool, who are the co-agents of the Peruvian and Bolivian governments, I have enjoyed favourable opportunities of examining samples of every description, and hope to show that many of the analyses of guano hitherto published have been made upon specimens not in their normal or sound state, like the best imported by the above houses from Chincha and Bolivia, but in a certain state of *eremacaucis** and decay.

Huano, in the language of Peru, signifies *dung*; a word spelt by the Spaniards, guano. The natives have employed it as a manure from the remotest ages, and have by its means given fertility to the otherwise unproductive sands along their coasts. While Peru was governed by its native Incas, the birds were protected from violence by severe laws. The punishment of death was decreed to the persons who dared to land on the guaniferous islands during the breeding period of the birds, and to all persons who destroyed them at any time. Overseers were appointed by the government to take care of the guano districts, and to assign to each claimant his due share of the precious dung. The celebrated Baron Von Humboldt first brought specimens to Europe, in 1804, which he sent for examination to Fourcroy, Vauquelin, and Klaproth, the best analytical chemists of the day; and he spoke of it in the following terms:—"The guano is deposited in layers of fifty or sixty feet thick, upon the granite of many of the South Sea islands off the coast of Peru. During 300 years, the coast birds have deposited guano only a few lines in thickness. This shows how great must have been the number of birds, and how many centuries must have passed over in order to form the present guano beds." The strata have undergone many changes, according to the length of time they have been deposited. Here and there they are covered with siliceous sand, and have thus been protected from the influence of the weather; but in other places, they have lain open to the action of light, air, and water, which have produced im-

* The decomposition of animal and vegetable bodies by the joint action of air and water, is shown by Liebig to be analogous to their combustion — as denoted by the term *eremacaucis*, a Greek word, signifying *slow combustion.*

portant changes upon them. Fresh guano is of a whitish or very pale drab colour, but it becomes progressively browner and browner by the joint influence of the above three atmospherical agents. Only *one* guano examined by Fourcroy and Vauquelin was found to contain a fourth of its weight of uric acid combined with ammonia, whence *that* appears to have been well selected by Baron Von Humboldt. They also found phosphates of ammonia, of lime, and of potash and ammonia, with some other constituents of little value in agriculture. Klaproth's analysis reported 16 per cent. of urate of ammonia, no less than 12.75 of oxalate of lime, 10 of phosphate of lime, 32 of clay and sand, with 28.75 of water and indeterminate organic matter. From the great proportion of clay and sand, Klaproth's sample of guano was obviously not genuine. I have met with no specimen of Peruvian guano that contained any appreciable quantity of clay, and none that contained above four or five per cent. of siliceous sand.

To Mr. Bland, of the firm of Messrs. Myers & Co., I am indebted for the following valuable information :

The Chincha islands, which afford the best Peruvian guano, are three in number, and lie in one line from north to south, about half a mile apart. Each island is from five to six miles in circumference, and consists of granite covered with guano, in some places to a height of 200 feet, in successive horizontal strata, each stratum being from three to ten inches thick, and varying in colour from light to dark brown. No earthy matter whatever is mixed with this vast mass of excrement. At Mr. Bland's visit to these islands, in 1842, he observed a perpendicular surface of upwards of 100 feet of perfectly uniform aspect from top to bottom. In some parts of these islands, however, the deposit does not exceed three or four feet in thickness. In several places, where the surface of the guano is 100 feet or more above the level of the sea, it is strewed here and there with masses of granite, like those from the Alpine mountains, which are met with on the slopes of the Jura chain. These seem to indicate an ancient formation for the guano. and terraqueous convulsions since that period. No such granite masses are found imbedded within the guano, but only skeletons of birds.

The good preservation of the Chincha guano is to be ascribed to the absence of rain ; which rarely, if ever, falls between the latitude of 14° south, where these islands lie, about ten miles from the main land, and the latitude of Paquica, on the coast of Bolivia, in 21 S. L. By far the soundest cargoes of guano which I have analysed, have come from Chincha and Bolivia. Beyond these limits of latitude, where rain falls in greater or less abundance, the guano is of less value—and what has been imported from Chile has been found by me far advanced in decay—most of the ammonia and azotized animal substances having been decomposed by moisture, and dissipated in the air (by the *eremacausis* of Liebig), leaving phosphate of lime largely to predominate along with effete organic matter. The range of the American coast from which the guano is taken must therefore be well considered ; and should not extend much beyond the Chincha islands as the northern limit, and Paquica, in Bolivia, as the southern.

The relative estimation of guano and nitrate of soda among the Peruvians is well shown by the following facts communicated to me by Mr. Bland :—

" Near the coast of Peru, about forty-five miles from Iquique (the shipping port of guano), there is the chief deposit of nitrate of soda. The farmers, who collect and purify this natural product, carry it to the place of shipment, and always require to be paid in return with an equivalent quantity of guano, with which they manure their land, to the exclusion of the far cheaper nitrate of soda. We cannot be surprised at this preference, when we learn that in the valley of Chancay, about forty miles distant from Lima, the soil produces, when farmed with irrigation in the natural way, a return upon maize of only fifteen for one, whereas, with the aid of

guano, it produces 300 for 1! Hence the Peruvian proverb, Huano, though no saint, works many miracles.

In the pamphlet recently published by Messrs. Gibbs and Myers, entitled "Peruvian and Bolivian Guano—its nature, properties, and results," we have a very interesting view of the best-established facts with regard to its operation and effects upon every variety of soil and in every variety of circumstance, as ascertained by the most intelligent agriculturists of the United Kingdom. The general conclusion that may be fairly deduced from the whole evidence is, that good guano will, under judicious application, increase the crops of grain, turnips, potatoes, and grass by about 33 per cent.; and with its present price of £10 per ton, at a cost considerably under the average cost of all other manures, whether farm-yard dung and composts, or artificial compounds. Guano is, moreover, peculiarly adapted to horticultural and floricultural improvement, by its relative cleanliness and facility of application.

The following observations upon guano, by Dr. Von Martius of Munich, addressed to the Agricultural Society of Bavaria, deserve attention:— "Among animal manures," says he, "it clearly claims the first place. It is uncommonly rich in ammoniacal salts, which act very favourably on vegetation. The ease with which these salts are decomposed, and exhale their ammonia into the air, is by him assigned as the reason why plants manured with guano generally present early in the morning accumulations of dew on the points of their leaves. The guano absorbs the atmospheric vapour, as well as carbonic acid; whereby it becomes so valuable a manure in dry barren regions. If we compare guano with other excrementitious manures, we shall find it far preferable to those afforded by man or other mammalia, which do not generally contain more than 20 per cent. of food that can be appropriated by plants. It is therefore five times better than night-soil, and also very superior to the French *poudrette*, which, being dried night-soil, loses, through putrefaction and evaporation, the greater proportion of its ammonial elements. In birds, the excretions both of the kidneys and intestines are contained in the cloaca, whereby the volatile elements of the former get combined with the more fixed components of the latter."

The guano is also a richer manure, on account of its being produced by sea-fowl, which live entirely on fish, without admixture of vegetable matter. The exposure also of the guano as soon as deposited to the heat of a tropical sun, in a rainless climate, prevents the components from fermenting, and *mummifies* them, so to speak, immediately into a concrete substance not susceptible of decomposition till it gets moisture; whereas the dung of our dove-cots suffers a considerable loss by exposure to our humid atmosphere. But in their action on vegetation, and in their chemical composition, these two bird excrements are analogous. Davy found in fresh dove-cot manure twenty-three parts in 100 soluble in water, which yielded abundance of carbonate of ammonia by distillation, and left carbonaceous matter, saline matter, principally common salt, and carbonate of lime as a residuum. Pigeons' dung readily ferments, but after fermentation afforded only 8 per cent. of soluble matter, which gave proportionably less carbonate of ammonia in distillation than the dung recently voided. Dr. Von Martius proceeds to compare the proportion of soluble salts in guano and pigeons' dung, and thinks that by that comparison alone he can establish the superiority of the former; but he should have considered that the insoluble urate of ammonia, which is so powerful and copious a constituent of good guano, and is present in much smaller proportion in pigeons' dung, is sufficient of itself to turn the balance greatly in favour of the Peruvian manure. His general estimate however, that the manuring power of genuine guano is four times greater than that of pigeons' dung, is probably

not wide of the truth. Besides the above-mentioned constituents, guano derives no small portion of its fertilizing virtue from the great store of phosphoric acid which it contains, in various states of saline combination, with lime, magnesia, and ammonia. Of all the principles furnished to plants by the soil, the phosphates are, according to Liebig, the most important. They afford, so to speak, the bones and sinews of vegetable bodies, while ammonia supplies them with their indispensable element, azote. Their carbon, hydrogen, and oxygen are derived from the air and water. Those products of vegetation which are most nutritious to man and herbivorous animals, such as bread-corn, beans, peas, and lentils, contain the largest proportion of phosphates. The ashes of these vegetable substances afford no alkaline carbonates. A soil in which phosphates are not present, is totally incapable of producing the above cereals. Agreeably to these views, Liebig believes that the importation of one hundredweight of guana is equivalent to the importation of eight hundredweight of wheat; so that one hundredweight of that manure assumes, with due culture, the form of eight hundredweight of substantial food for man.

(To be continued.)

PHENOMENON ATTRIBUTED TO GUANO.

The Architectural Section of the *British Archæological Association*, at the recent meeting at Canterbury, was enlivened by a piece of information contributed by Dr. Buckland. He held in his hand, he said, a note directing his attention to the fact, that the roof of the adjoining cathedral was covered with guano; so that, should a heavy rain occur, it was not impossible that Canterbury cathedral might be burnt down within two days. The cathedral at Pisa, was burnt down in this way. He had observed upwards of fifty pigeons about the Cathedral in his own hurried observations, and more than fifty broken panes of glass. He wished to call attention to the subject, that something might at once be done. Dr. Spry, a prebend of the cathedral, apologized for the broken panes; and Mr. Austen, the surveyor, under whose superintendence one of the great west towers has been rebuilt, directed the doctor's attention to two fat robins that frequented the choir of the cathedral, from which equal mischief might as easily be anticipated; and then, in a plain, blunt, uneducated way, recommended Dr. Buckland to call the attention of the Lord Mayor of London to the quantity of swan's dung in the river, which to his, Mr. Austen's thinking, was just as likely to set the Thames on fire."—*Athenæum.*

EXAMINATION OF SPECIMENS OF COMMERCIAL BLUE PILL AND MERCURIAL OINTMENT.

We extract the following statements from the report of a Committee of the College of Pharmacy, of New York, published in the April number of the *American Journal of Pharmacy*:—

"The standing committee of inspection, assisted by the Professor of Chemistry, and by certain members of the Board of Trustees, specially appointed to examine the various samples of mercurial ointment and blue pill mass to be found in this market, beg leave to report:—

"That they collected from different vendors, and not from the manufacturers themselves, the following specimens of those articles, all of which have been subjected to a rigorous examination by Mr. Lawrence Reid, Professor of Chemistry to the College, and the following results have been obtained:—

TABLE I.

Results of Examinations of different Specimens of Mercurial Ointment.

No.	PROCURED FROM.	MANUFACTURED BY.	Per centage of Mercury.
1	Rushton & Co.....	Mander, Weaver, & Mander...	46
2	James S. Aspinwall.....	George C. Close.....	30½
3	Adamson & Olliff	Ditto, said to be of U. S. Pharmacopœia strength ...	43
4	Ditto	George C. Close, of his usual commercial strength	30
5	Olcott, McKesson, & Co.	Southwick & Prior	21

TABLE II.

Results of Examinations of three different Specimens of Ointment, at different Depths of the same Jars, to ascertain the settling of the Mercury therein.

No.	PROCURED FROM.	MADE BY.		Per-cent. of Mercury.	Average per-centage.
1	Lawrence & Keese..	Southwick & Prior	Upper Stratum	19.32	
			Middle "	20.77	
			Bottom "	20.78	20.29
2	Hull & Bowne.....	George C. Close ...	Upper "	31.40	
			Middle "	35.	
			Bottom "	35.58	33.99
3	Olcott, McKesson, & Co.....	Southwick & Prior	Upper "	21.05	
			Middle "	21.11	
			Bottom "	21.62	21.26

TABLE III.

Results of Analysis of Blue Pill Mass.

No.	PROCURED FROM.	MANUFACTURED BY.	Per centage of Mercury.
1	Rushton & Co.....	Mander, Weaver, & Mander ...	32
2	James S. Aspinwall.....	Farr, Powers, & Wrightman ...	28
3	Ditto	Davy, Macmurdo, & Co.....	34
4	Ditto	Mander, Weaver, & Mander ...	33
5	Adamson & Olliff.....	In Edinburgh	28
6	Ditto	Herrings, of London	32
7	Olcott, McKesson, & Co.	Southwick & Prior	20
8	Adamson & Olliff	Imported by J. A. Rea.....	26
9	George D. Coggeshall...	George C. Close.....	26
10	Adamson & Olliff	Southwick & Prior	20
11	Ditto	George C. Close.....	31½

The following letter from the Professor of Chemistry to the College, points out the method of examination that was adopted:—

"*New York, Feb.* 13*th*, 1844.

"Gentlemen,—In compliance with your request, I beg leave to state, that the following methods were adopted to ascertain the per-centages of mercury in Blue Pill and Mercurial Ungt.

"The blue pill was washed with warm water and also alcohol, to remove such organic matters as were soluble in these fluids; it was dried until it was of the consistence of a thick paste, then mixed with an equal weight of sulphuric acid—the whole being heated until the remaining organic matter was decomposed and carbonized; the persulphate of mercury and carbonized matter so obtained were boiled with a solution of chloride of tin, to reduce the mercury; the precipitate was washed and dried, and the mercury separated by sublimation in glass tubes.

"The mercurial ointment was treated with warm water, by which means the greatest part of the lard separated, floating on the surface of the water; it was then washed with a little alcohol to remove any water attached to it, and then triturated with hot spirits of turpentine which displaced the remaining unctuous matters; then washed with warm alcohol twice, to cleanse it from the turpentine and grease: upon drying it at a temperature of about 90° the mercury will assume the form of globules, or may be made to do so by pressing it together.

"Your most obedient servant,

"LAWRENCE REID.

"*To the Committee of the College of Pharmacy, New York, on Mercurial Preparations.*"

ON THE DECOMPOSITION OF BENZOATE OF AMMONIA BY HEAT.

BY M. FEHLING.

SUCCINIC and benzoic acids resemble each other in so many of their properties, that in most old works on chemistry, the description of one is placed immediately after that of the other. This analogy is especially evident in the compounds of these two acids with ammonia. On evaporating the aqueous solutions of the ammoniacal salts, ammonia is disengaged with the vapour driven off, and it is only with the utmost care, and under particular circumstances, that neutral benzoate or succinate of ammonia can be obtained by the humid way. The product obtained by simple evaporation is not constant in its composition.

If dry succinate of ammonia be heated more strongly, it again disengages ammonia with water, and *bisuccinamide* is formed, amide of unibasic succinic acid.

The action of heat on benzoate of ammonia is not understood; any experiments on this subject, therefore, are of interest. The amide of benzoic acid has not been formed, because benzoic acid is a unibasic acid, while succinic acid is polybasic. If benzoate of ammonia be evaporated just to dryness, and the mass be then put into a retort to which a refrigerator is adapted, it will be seen, that as soon as the mass has melted, a product rises in sublimation, and is deposited, in part, in the neck of the retort, but ammonia is at the same time disengaged, and a small quantity of water distills over. When the operation has continued for more than an hour, the condensation of drops of water still continues in the refrigerator, so that it appears probable, *à priori*, that this water is formed under the action of the heat by the combination of its elements. On continuing the operation, there will be found to pass over with the water some drops of oil having the characteristic smell of oil of bitter almonds. The fused residue in the retort, which also smells strongly of oil of bitter almonds, affords by distillation with water a still greater quantity of this oil. When

the mass in the retort has been reduced to dryness by distillation, it is again to be heated until it fuses, then distilled with water as before, and this operation repeated until a sufficient quantity of the oil has been obtained.

To purify the oil, first wash it with a small quantity of hydrochloric or sulphuric acid diluted with water, so as to remove any ammonia; then wash it several times with pure water, dry it over chloride of calcium, and, lastly, obtain it in a state of complete purity by distillation; it will now be permanent.

This oil is perfectly clear and colourless, its smell is strong and agreeable, it dissolves in about 100 parts of water at 212° Fahr., forming a somewhat opaque solution, but on cooling, some of the oil separates. It dissolves in all proportions in alcohol and in ether, and has a hot taste. It sinks in cold water, but if the mixture be heated, it becomes lighter than the water; at 59° Fahr., its specific gravity is 1.0073. It begins to boil at 374° Fahr., the point of ebullition then rises a little, but remains constant at about 376°. It is inflammable, and burns with a brilliant and fuliginous flame; it strongly refracts light—the coefficient of its refraction was found by Professor Rensch=1.503.

On treating this oil with hydrate of potash, the presence of a large proportion of nitrogen was detected. Potassium produced no change in the colour, even after a long-continued contact; it is only after the application of heat for some time, that it assumes a brown colour. Analysis gives the following formula for its composition—$C_{14}\ H_5\ N$*.

It is easy to explain the production of this oil from benzoic acid and ammonia. Thus,

$$C_{14}\ H_5\ O_3 + N\ H_3 = C_{14}\ N_5 + 3\ H\ O.$$

The nitro-benzoyle of M. Laurent=$C_{14}\ H_5\ N$, has, then, the same composition as the substance under consideration, but the formation and the properties of nitro-benzoyle are quite different; these two bodies therefore, are isomeric.

As M. Laurent has named the body which he discovered nitro-benzoyle or nitro-benzoile, as there already existed an azobenzoile, the author thinks the product obtained from benzoate of ammonia may be called *benzonitrile*.

The sublimed substance obtained during the distillation of the benzoate of ammonia, and the residue in the retort, are both easily soluble in water, and the solution has an acid reaction. They both, also, give out the odour of ammonia on the addition of hydrate of lime.

The product of the sublimation is very light and bulky. Chloride of platinum indicates the presence of ammonia in it. The addition of an acid to a solution of it produces a white precipitate, but little soluble in cold water, but more soluble in hot water. Analysis shows it to be pure benzoic acid.

The residue of the retort is coloured, but may be purified by repeated crystallizations from water, and then washing it with alcohol and a small quantity of water; what remains is pure benzoate of ammonia.—*Annalen der Chemie und Pharmacie*, and *Journal de Pharmacie*.

ON THE SOLUBILITY OF SULPHATE OF LIME IN WATER.

BY M. POGGIALE.

In a notice regarding the solubility of sulphate of lime, just published by M. Lassaigne, in the *Journal de Chimie Médicale*, this distinguished Chemist, after stating that the degree of solubility of sulphate of lime is but imperfectly known, has laid it down that 332 parts of water, at 50° or 212° Fahr., dissolve one part of this salt.

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* The equivalent of carbon is here taken at 75.854.

I beg leave to make a few remarks on this subject. I determined the solubility of sulphate of lime by several experiments, of which I made known the results in a paper on the solubility of the salts, which I published in August, 1843, in the *Annales de Chimie et de Physique*. From that paper the following is quoted :—

"SOLUBILITY OF SULPHATE OF LIME.

Temperature.	*Salt dissolved by 100 parts of water.*
32° Fahr.	0.205
41 "	0.219
53.6 "	0.233
68 "	0.241
86 "	0.249
95 "	0.254
104 "	0.252
122 "	0.251
140 "	0.248
158 "	0.244
176 "	0.239
194 "	0.231
212 "	0.217

"Each of the preceding results is the average of six experiments.

"The line of solubility of sulphate of lime follows a course almost similar to that of sulphate of soda, which has been traced so very carefully by M. Gay Lussac. In fact, the line of solubility of sulphate of lime is formed, as that of sulphate of soda, of two curved lines, having a point of retrogression corresponding to about 95° ; only this point is graphically less marked for the sulphate of lime. Thus the solubility of this salt increases from 32° up to about 95°, where it is at its maximum, and then diminishes to 212°. *At 212° it is nearly as soluble as at* 41°."

This last result approximates, as may be seen, to that just obtained by M. Lassaigne. But I regret I cannot admit with him, that 332 parts of water dissolve one part of sulphate of lime. According to my experiments, which have been numerous and carefully made, 393 parts of water, at 95°, are necessary to dissolve one part of this salt. I am satisfied that M. Lassaigne was not aware of what had been done by me at the time he wrote this notice.—*Journal de Chimie Médicale.*

ON THE ODOUR OF CASTOREUM.

BY WÖHLER.

Carbolic acid, first discovered by Runge in coal-tar, and subsequently obtained as a product of decomposition of salicylic acid, and termed hydrate of phenyle, so strikingly resembles in odour fresh castor, that it is probable the latter owes its odour to carbolic acid. The volatile oil obtained by distillation of castor, is probably nothing but carbolic acid—its operation on chromic acid, which it changes to a black colour, would prove this point. Its action on the organism should be examined, as it might prove of importance in the practice of medicine, and might become a substitute for castor.—*Annalen der Chemie und Pharmacie,* Band xlix., Heft 3.

ON THE ADULTERATION OF SUCCINIC ACID

(Succinic Acid containing one-sixth of Sulphate of Alumina and Potash).

BY M. PELTIER.

Succinic Acid, by reason of its high price, is subject to several adulterations in commerce, and the least inconvenience resulting from this is the substitution of an article of moderate price for one of rather a high price.

Succinic acid being employed as a medicine, it is important that we should ascertain its purity when we intend it for this purpose. Several frauds have been already noticed ; as those by tartaric acid, bisulphate of potash, hydrochlorate of ammonia, and by oxalate of potash. I now shall notice a new adulteration of this acid by sulphate of alumina and potash, in the proportions of one-sixth. This fraud is readily detected by reagents, which do not act on succinic acid : thus, in an aqueous solution of a mixture of succinic acid and of sulphate of alumina and potash, barytes gives a white precipitate, insoluble in nitric and hydrochloric acids ; ammonia forms a gelatinous precipitate soluble in an excess of this alkali, the perchloride of platina an orange yellow precipitate, all these reactions being characteristic of alum with a base of alumina and potash.

To effect the separation of these substances boiling alcohol at 0.88 is an excellent means, in the proportion of four parts of alcohol to one of the acid to be examined.

Succinic acid is entirely dissolved, the sulphate of alumina and potash remains, it is weighed after being dried, and may be treated in a separate state by the reagents already mentioned. The alcohol solution, on cooling, leaves the succinic acid, which is very little soluble in alcohol in the cold state. We must, however, satisfy ourselves whether the substance dissolved by alcohol is really succinic acid ; for at the present day the industry of sophisticators is so daring, that I should not feel astonished if there should circulate in commerce, under the appellation of succinic acid, mixtures which had nothing else of it but the mere name.

Pure succinic acid, placed on charcoal in a state of incandescence, is diffused through the air in the form of very acid white vapours, and leaves no carbonaceous residue.

Among the numerous chemical reactions which distinguish it, we may confine ourselves to the two following, which are, I think, the most prominent.

The aqueous solution of succinic acid forms with the acetate of lead a white precipitate insoluble in water, soluble in nitric acid ; in the state of a soluble succinate, it throws down the neutral persalts of iron in flocculi of a reddish brown colour.—*Journal de Chimie Médicale*, June 1844.

ON MONESIA.

BY C F. P. VON MARTIUS.

The substance recently introduced into Europe under the name of *Monesia*, and extolled as an efficacious astringent, is the bark of a lofty tree, the *Chrysophyllum Buranheim*, Riedel. It is thick, compact, and heavy ; with a taste at first sweet, then austere and styptic. It contains much pectic acid, stryphnic [tannic] acid, a peculiar acrid principle called *monesine*, allied to saponine and parilhine, glycyrrhizen, chlorophylle, wax, stearine, traces of aroma, a red colouring matter said to be similar to that found in cinchona bark, malic acid, malate and phosphate of lime, phosphate of magnesia, sulphate, muriate, and malate of potash, oxides of iron, and manganese and silicia.

The commercial extract is made in the Brazils. It constitutes about one-fourth part of the bark. It is entirely soluble in water, great part so in alcohol, and but slightly so in ether. It belongs to the strengthening and astringent substances which contain stryphine (tannin), with mucilaginous and sweet matters ; and, which therefore act mildly on the human body.

The Brazilians use it against bucorrhœa, atonic diarrhœa, uterine hemorrhage, chronic inflammations of the mucous membranes, &c. It has also been recently used in France and Germany with success.—*Systema Materiæ Medicæ Vegetabilis Braziliensis.*

OBITUARY.

THE DECEASE OF MR. CHARLES JAMES PAYNE.

When giving our readers the intelligence of the indisposition of Mr. Payne in our number for July last, we did not expect so soon to be called upon to announce his decease, which melancholy event is an irreparable loss to his friends, and in an especial manner to the Pharmaceutical Society. Although his illness had been severe, and had continued with occasional intervals of convalescence for several months, the fatal termination of it was a shock for which we were not prepared. During all the proceedings of the Society, from its commencement, Mr. Payne was so much identified with what was going on, and took so prominent and, at the same time, so unobtrusive a part in every active measure, that it was difficult to become reconciled even to his temporary absence, and the idea that he might never join us again was too painful to be dwelt upon. We therefore lived in hope until the last, and anxiously looked forward to the time when we should meet again, and renew that friendly intercourse which had been so great a privilege. But Mr. Payne's more immediate connexions entertained more serious anticipations and fears as to the result of his illness, as appears from the account which we have subsequently received, and which is embodied in the following brief memoir.

Mr. Payne was born on the 28th of January, 1794, at the house of his maternal grandfather, an apothecary, in Titchfield Street, Oxford Street. He was an only child, and lost his father at a very early age; but was placed by his mother under the care of the Rev. Dr. Hamilton, of Hemel Hempstead, with whom he remained from the age of seven until he had completed his fifteenth year. At fourteen he was apprenticed to Mr. Burkitt, of Fleet Street, but did not commence his London life until a year afterwards. In this situation he remained six years. He attended the usual routine of lectures, among which were those of Abernethy, and he obtained the Botanical Prize in 1811.

At the age of twenty-one he took up his freedom, and became a member of the Apothecaries' Company; after which he went to Mr. Winstanley, in the Poultry, where he remained for two years and a half.

In May, 1817, Mr. Payne opened a Chemist's shop, in St. Martin's Court. He could not be said to practise as an Apothecary, as he never professed to act in this capacity, having a decided dislike to the profession. Nevertheless, he made the qualification which he possessed available for benevolent purposes, by occa-

sionally practising gratuitously. For a few years he was in the habit of cupping, but this he gradually relinquished, and always considered himself a Chemist and Druggist, and acted as such, although he retained his *nominal* standing as a Member of the Apothecaries' Company.

The first occasion on which Mr. Payne united with his brethren in any public proceedings was in the year 1839, when meetings of the Chemists and Druggists were held for the purpose of promoting the closing of shops on Sunday. Having adopted this custom himself ever since the year 1826, and having had satisfaction in so doing, he was anxious to prevail upon others to take the same serious view of the subject and act accordingly.

At the meeting of the trade which was held at the Crown and Anchor tavern, on February 15, 1841, a gentleman made some observations which were received with universal approbation, and which showed that the speaker was an eloquent and zealous advocate of the independence and established privileges of Chemists and Druggists. The clear sound reasoning and judgment evinced in those remarks, made a deep impression, and although few present were aware at the time who the speaker was, he was soon discovered to be Mr. Payne, of St. Martin's Court. A short time afterwards, a Member of the Committee, anxious for the co-operation of a man who evidently was calculated to render valuable assistance in the labours in progress, waited on him, and requested him to allow his name to be placed upon the Committee. To this he assented after some hesitation; and from that day to the time when the state of his health obliged him to retire from office, he was the most indefatigable Member of the Committee and Council, one whose sound judgment gave his opinion much weight, and whose amiable disposition tended more than any other circumstance to promote the harmony which fortunately prevailed. In every case of difficulty, whenever differences of opinion on minor points happened to occur, Mr. Payne displayed all the tact of an experienced politician, with the persuasive influence of a sincere friend to all parties. One of his peculiarities was the possession of an unusual share of common sense, and so great was the confidence reposed in his judgment by the other Members of the Committee, that on the formation of the PHARMACEUTICAL SOCIETY he was unanimously elected Vice-President. This election, and his subsequent election as President, reflected especial credit on his sterling worth and unimpeachable character, as his position in the trade, his retired habits, and mode of life, were not calculated to give him any influence, except that which was due to his intrinsic merit.

For several years before his decease, Mr. Payne's health had

been slowly and gradually declining. His constitution being naturally delicate, and his mind sensitive, the duties which devolved upon him, not only in the capacities above alluded to, but also in the various benevolent occupations in which he was engaged, in addition to his regular business, produced a degree of excitement and fatigue which undermined his health. He had previously suffered from a severe attack of typus fever, in the autumn of 1812; and in 1826 the loss of his wife occasioned a recurrence of the tendency to this complaint, to which he was more or less subject during the remainder of his life. Of late years, although not suffering from any particular disease, he was very far from robust, and frequently found it necessary to retire to the country to recruit his strength. In the year 1842 his health manifestly declined, and it did not afterwards regain its former tone.

In the month of May last, an attack of inflammatory action of the brain, accompanied with typhoid symptoms, confined him to his bed, and from that time he appeared sensible that it would not be in his power to pursue the active engagements which had hitherto occupied him. In a letter which he wrote about that period to the Council of the Pharmaceutical Society, he stated that he felt unequal to further exertion and excitement, while the interest which he expressed in what was going on, and the clearness of his ideas on the subjects to which he alluded, led his brethren to entertain a fallacious hope that the disorder was but transient.

In June he went to Hampstead, and subsequently to Worthing; and returned to London on the 15th of August. Mr. Walne, Mr. Pidcock (of Watford) and Dr. Roots, who were his medical attendants, entirely concurred as to the nature of the complaint; but their endeavours to relieve him were in vain. Mr. Payne described his own view of his case in these words, "My vital energies are gone: I have not strength enough *to be ill.*"

Some hopes were occasionally entertained of his recovery until two days before his death; but we are informed that none existed in his own mind, as he was impressed with a conviction that he could not long survive. His decease took place on the evening of the 5th of September; and on the afternoon of Saturday, the 14th, his remains were deposited in the vault of St. Martin's church. Mr. Payne was universally beloved and respected. His neighbours closed their shops on the day of the funeral, and many of his friends followed his remains to the place of interment.

A FEW PARTICULARS RELATING TO THE LIFE OF THE LATE DR. DALTON.

Dr. Dalton was the son of Mr. Joseph Dalton, a farmer of Eaglesfield, near Cockermouth. He was born on the 5th of September, 1766. At the age of twelve or thirteen, he went to a day-school in the village, but occupied his vacant time by assisting in the cultivation of the farm. He had an early taste for mathematical pursuits, and about the period alluded to, was noticed by a Mr. Robinson, who, being a man of property and liberal education, directed and assisted him in his studies, in which a young man named William Alderson was his companion.

In 1781 he went to Kendal, where he made further progress, became a teacher of mathematics, and contributed largely to two periodicals, on subjects of a philosophical character.

In 1788 he commenced his Meteorological Observations, which he continued until the time of his death; and in 1793 he published a volume of "Meteorological Observations and Essays." About this period he had entertained the idea of studying physic or law, but this he abandoned on the occurrence of a vacancy in the New College, Mosely Street, Manchester, where he became a Professor of Mathematics and Natural Philosophy, and remained there until the College was removed to York.

After leaving the College, in 1799, Dalton for many years taught the rudiments of mathematics, at the charge of eighteenpence an hour. His recreations were as regular and methodical as his scientific pursuits. Every Thursday afternoon, during the summer months, he was accustomed to repair to a bowling-green on the Stretford Road, a practice which he kept up for many years. Before beginning to bowl he would carefully take from his pocket a piece of paper, write his name on it, and place it under his refreshment glass. He then commenced his game, in which he joined with much energy, until the stated time for departure arrived.

Soon after he left the College, he occupied, for the purposes of instruction and study, the lower rooms of the Literary and Philosophical Society, in George Street, Manchester. His residence was on the other side of the street, and he was generally seen, on rising in the morning, crossing over to his laboratory to light his fire, after which he returned to wash and shave, and after breakfast he returned to the laboratory for the remainder of the morning. His laboratory was never remarkable for neatness, and if, during one of his summer excursions, an unlearned charwoman happened to find her way into it, the offence was almost unpardonable. His bottles were of every shape, size, and colour, from Daffy's Elixir bottles to Henry's Magnesia. His apparatus was of the most humble and inexpensive description, and he

often performed experiments at a cost of a few shillings on which others would spend as many pounds.

Dalton became a member of the Manchester Literary and Philosophical Society in 1794. The first paper which he read to the Society afterwards related to a peculiarity of vision with which he was affected. It was entitled "Extraordinary Facts relating to the Vision of Colours, with Observations by Mr. John Dalton." He continued to furnish numerous papers on philosophical subjects to this institution. His grand discovery—that of the atomic theory, first presented itself to his mind in 1803 or 1804. In the latter year he referred to it in his lectures. In 1807 he developed his views more fully in lectures delivered in Edinburgh and Glasgow. Mr. Higgins, a Professor of Chemistry in Dublin, claimed the merit of the discovery, and for a time prejudiced Sir H. Davy and others in his favour; but it was not long before the erroneous impression was removed, and Sir Humphry Davy, in the last course of lectures delivered by him at the Royal Institution (1814), speaking of the discoveries of modern times, stated that the greatest step in science was the application of Mathematics to Chemistry, for which the world was indebted to Dalton.

The first public course of lectures delivered by Dr. Dalton in Manchester, consisted of twenty lectures on Experimental Philosophy, which he delivered in the rooms of the above-mentioned society in 1805. He afterwards lectured in the Mechanics' Institute, in the Pine Street School, and also in the Royal Institution of Manchester. In 1804 he lectured at the Royal Institution of London, and also in 1810: subsequently he lectured in Leeds and Birmingham.

Dalton was elected a Fellow of the Royal Society about the year 1821. He was elected Corresponding Member of the Institute of France, and a few years afterwards was enrolled one of the Foreign Fellows. He became President of the Manchester Literary and Philosophical Society in 1817. He was also a Member of the Royal Society of Edinburgh, the Royal Academy of Science of Berlin and Munich, and of the Natural History Society of Moscow; Honorary Member of the Royal Medical Society of Edinburgh, and of the Philosophical Societies of Bristol, Cambridge, Leeds, Sheffield, and Yorkshire.

In 1822 Dr. Dalton visited France, where he was received by the leading philosophers in a manner becoming his character. In 1826 George the Fourth presented the Royal Society with one hundred guineas, for the purchase of two gold medals, to be awarded by the Council to such individuals as they thought most eminent for their scientific discoveries. The first was unanimously awarded to Dr. Dalton. A full-length statue of the doctor was undertaken by Sir Francis Chantrey in 1833, a subscription of

two thousand pounds having been raised for that purpose. The statue is now in the entrance-hall of the Royal Manchester Institution.

About the same time the government conferred on him a pension of one hundred and fifty pounds per annum, which in 1836 was increased to three hundred, on the solicitation of some of his friends and admirers.

Dr. Dalton was universally respected and esteemed, not only on account of his intellectual acquirements, great perseverance, and philosophical turn of mind, but also for his moral integrity and scrupulous love of truth. An instance of the latter quality may be interesting to our readers. A student, on applying to him for a certificate of attendance on a course of his lectures, admitted that he had been absent from one lecture, on which the doctor reluctantly said he was afraid he could not give him the certificate for the course; but added, after a little reflection, "If thou wilt come to-morrow, I will give thee that lecture over again."

On the 18th of April, 1837, when in his 71st year, Dr. Dalton had a severe attack of paralysis, which was followed by a slight attack on the 21st of the same month. He never entirely regained his former robust health; and on the 17th of May last he had a third paralytic stroke, from which he only partially recovered. On the 19th of July he was well enough to attend a meeting of the Council of the Manchester Literary and Philosophical Society, on which occasion he was presented with an engrossed copy on vellum, of a resolution of that Society, passed at its annual meeting, recording their admiration of his scientific abilities and perseverance, in appropriate language. The doctor being unable to articulate, returned a brief acknowledgment in writing.

On Friday, the 26th of July, Dr. Dalton was observed to be more feeble than usual, and, although he made his regular meteorological memoranda as usual, which he had done without intermission for 50 years, the figures were scarcely legible. About a quarter before seven on the following morning he quietly expired, without a struggle, in his 78th year.

A correspondent informs us, that after death his likeness to Newton, which had been frequently remarked during life, became still more striking.

The remains of the doctor were removed to the Town Hall, and were visited during one day by 40,000 persons. His funeral was conducted with a degree of pomp and magnificence not unworthy of his merit as a philosopher, though inconsistent with his disposition and character as a member of the Society of Friends. The procession consisted of nearly one hundred carriages, and many hundred persons on foot, extending about three-quarters of a mile. The shops and warehouses were closed for two hours, during its progress to the cemetery.

BOOKS RECEIVED.

SELECTA È PRÆSCRIPTIS. Ninth Edition, much improved.—*London, S. Highley, 32, Fleet Street.* 12mo, pp. 308.

THIS work comprises selections from physicians' prescriptions, containing lists of the terms, phrases, contractions, and abbreviations used in prescriptions, with explanatory notes; the grammatical construction of prescriptions; rules for the pronunciation of pharmaceutical terms, and a series of abbreviated prescriptions, illustrating the use of the preceding terms; to which is added a Key containing the prescriptions in an unabbreviated form, with a literal translation.

We have already had occasion to recommend to our readers the previous editions of this little book, but the present edition is so much enlarged and improved, that we may be allowed to notice it again. Among the additions, we may mention a copious index, some rules for the pronunciation of pharmaceutical terms, numerous fresh examples, and notes illustrating the art of prescribing. It is a very excellent work for students in pharmacy. The author does not put his name to the little book, but he need not be ashamed to own it, although he is the author of a great book.

THE POCKET FORMULARY, *and Synopsis of the British and Foreign Pharmacopœias; comprising standard and approved Formulæ for the officinal and extemporaneous Compounds employed in Medical Practice, in Great Britain, America, France, Germany, &c. Arranged in Alphabetical Order, by* HENRY BEASLEY. Third edition, corrected, improved, and enlarged. *Sherwood, Gilbert, and Piper.*

THIS little book is now extended to 486 pages, the additions which have been made to it exceeding in extent the whole contents of the volume as originally published. It has become a very useful appendage to the dispensing counter, and we have no doubt will have an extensive circulation. The author has evidently spared no pains in collecting from various sources the formulæ most likely to be useful in the preparation and dispensing of medicines.

TO CORRESPONDENTS.

THE NEW METHOD OF SILVERING GLASS.

Five Correspondents having informed us that they have tried the process given in this volume, p. 82, without success, we have ascertained by further experiments that it would be better to use more spirit of wine. Four drachms, instead of one, would render the result more certain, by insuring the perfect suffusion of the oil throughout the whole fluid. The samples of nitrate of silver sent by Mr. Simons are good. An Associate (York), in using ʒiv, instead of four grains was very extravagant.—A. P. S. (London): If the quantity of nitrate of silver be increased, the essential oil should be increased in the same proportion. [We have not tried the substitution of copper for silver in this process, but advise our Correspondent to try it.]

A. P. S. (Plymouth).—(1.) See the last answer.—(2.) Wanted a good work on dying leather.—(3.) See vol. ii., p. 493.—(4.) Superoxalate of potash may be used for taking out black ink stains.—(5.) We cannot account for the spontaneous combustion of smallcoal in the manner alluded to.

℥i.—We have generally heard the word *Caoutchouc*, pronounced literally as spelt. *Chyrata* is pronounced tschirayta, or tschyretta.

X. Y. Z.—Tinct. Matico. ℞. Matico ℥ij, Sp. Vini Rect. ℥xvj., macerate six days.

A. P. B.—Green show colour, see vol. iii. p. 96.

A Correspondent inquires—(1.) How to distil whisky on a small scale? [We have had no experience in the process.]—(2.) How to melt Burgundy pitch before spreading a plaster? [With the plaster-iron on a piece of paper].—(3.) We cannot answer the question.

A. P. S. (London) complains of the practice adopted by some Patent Medicine Proprietors of sending persons to Chemists for their goods, in order to induce them to buy the same; which, not being called for, are left on the hands of the Chemist.

N. B.—We understand the "black draught and pill" gentleman, mentioned in our last number, has been apprehended and committed for trial.

S. A. wishes for formulæ for universal cement, liquid phosphorus, and preparation for patent leather.

"A Member."—We gave some formulæ for cements for stopping teeth, vol. iii., p. 589; but we believe nothing is so good as gold, properly applied.

J. P. E.—An ointment consisting of iodide of potassium and lard, will be free from colour if the lard be pure and fresh. The lard usually met with in commerce sometimes occasions a slight decomposition of the iodide, giving rise to a yellowish tint. This change of colour ought not to occur immediately on mixing the ointment.—(2.) *Lindley's Elements of Botany*, 10*s.* 6*d.*

"A Member."—(1.) The limit of the two-penny post as mentioned in the Medicine Duty Act, is three miles from the General Post-office. Application should be made at Somerset House when any doubt exists in reference to the licence.—(2.) Sp. carbonis rectif. may be interpreted rectified wood spirit.—(3.) Tinct. rosæ. The only form we have seen is Squire's, vol. i., p. 585.

"An Apprentice."—(1.) Decoction or extract of poppies is essentially different from opium, and it is difficult, therefore, to make an accurate comparison of their respective strengths. Such comparison can only be made from observation of their effects, and our Correspondent cannot do better than follow the authority he mentions, or some other equally good.—(2.) The best sealing-wax is made with shellac, coloured with vermilion.

A. P. S. (London).—(1.) The saccharometer is an hydrometer adapted for fluids more dense than water. See vol. ii., page 448.—(2.) The seventh is the last edition of *Turner's Chemistry*, price £1 8*s.*

P. S.—The sample consists of Alexandrian senna, with a little cynanchum as usual. See vol. ii, p. 63.

"Quassia."—We very much approve of the course of study mentioned by our correspondent. In addition to the works enumerated, we should recommend Selecta è Prescriptis, of which we have given a notice in this number.

"Trojan."—Parnell's *Elements of Chemical Analysis* approaches nearest to the kind of work described as wanted.

"Carolus."—We believe that essential oils might prove injurious to the hair if used in excess, but not in moderation. It is difficult to say which is likely to be least injurious—probably rosemary.

Speculator.—The quantity of lithic or uric acid contained in guano is very variable; some specimens contain little or none. This is not, therefore, a good source from which to obtain a supply of uric acid. It may be obtained in abundance, and in a state of considerable purity, by treating the white solid excrements of the large serpents at some of the menageries, in the manner described by our Correspondent.

"THERIACA" wishes for formulæ for anchovy paste, transparent soap, and currie powder.

A. P. S. (Bath.)—(1.) See the Pharmacopœia.—(2.) Oil may be bleached by filtration through animal charcoal, or by exposure to light.—(3.) Essence of camphor, for making camphor julep, is a weak spirit of camphor, *viz.*, Sp. Camph. p. j., Sp. V. R. p. ij. M.

R. G. (1.) recommends castor oil as a vehicle for Pil. Hyd. Chlorid. Co. [This may possibly be a good vehicle, but we doubt whether it is, on the whole, better than treacle, and could not recommend the substitution without authority].—(2.) The explanation of the gooseberry question is not sufficiently conclusive for publication.—(3.) The spring.

MR. PARKER.—See the above (No. 1.)

"OPUS."—We do not think the circumstance alluded to arises from the presence of copper, or the excess of ammonia. We have not met with a formula free from objection.

"AN ASSISTANT" complains of the very short time which he can obtain for study, and wishes some means could be adopted to give Assistants more facilities for this purpose than they now possess. [We hope the time will come when a decided improvement in this respect will take place.]

"A MEMBER" (Stepney).—The two figures in the diploma are *imaginary* portraits of ancient Chemists. They have been called Galen and Avicenna, but any other names will do as well.

J. C.—The name alluded to is on the list of members. Applications for admission should be made to the Secretary. The deposit in the mixture referred to is occasioned by the liquor potassæ precipitating the camphor. It should not be filtered without orders.

"PHARMACIEN" will, we fear, be disappointed if he expects to see the work very soon.

S. O. S.—About half an ounce of the solid extract of sarsaparilla of the ordinary consistence is equivalent to a pint of decoction. Of the solid compound extract rather more. We are not acquainted with the mode of preparing dandelion coffee.

"A MEMBER."—(1.) Mantell's *Medals of Creation* may perhaps answer the purpose.—(2.) The second part of Bellingham's *Materia Medica* has not been published.

T. D.—(1.) Some sulphates are soluble in muriatic acid.—(2.) Thenard's *Traité de Chimie.*

"AN ASSOCIATE" (Canterbury).—(1.) The preparation of chloride of nitrogen is described in most works on systematic chemistry, but it is too dangerous a substance to be experimented with.—(2.) We are not acquainted with the process for rendering shellac white.—(3.) It would be improper to publish it, if we were able to do so.—(4.) The crystalline lens of the eye is supposed to consist of albumen in a peculiar condition.

"A MEMBER."—In vol. iii, p. 54, we explained, as clearly as we could, the Act relating to Patent or Proprietary Medicines, and the licence for selling the same. We presume that this law applies to all vendors, *confectioners* as well as others.

We have been obliged to postpone our article on the Analysis of Soils, and the continuation of the one on Rhubarb, to make room for Professor Donovan's interesting paper on Cinchona, which we were anxious to publish *entire* this month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to THE EDITOR, 338, Oxford Street.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. V.—NOVEMBER 1st, 1844.

PROPOSED ALTERATION IN THE TERMS OF SUBSCRIPTION TO THE PHARMACEUTICAL SOCIETY.

When the Pharmaceutical Society was projected, nearly four years ago, there was one question which gave rise to much discussion, and on which it was found very difficult to arrive at a conclusion satisfactory to all parties, and this question was, How is the Institution to be supported?

Had we been in France, Germany, or Russia, the natural course would have been to apply to the government, to point out the public utility or necessity of such an institution, and this being demonstrated, the requisite means would have been provided from the public purse. But in this country the public purse is not so easy of access, and those who desire to render a service to the community at large, or to that section of it to which they belong, by the introduction of any improved systems in which expense is involved, must put their hands into their pockets.

It was therefore evident that if the Pharmaceutical Chemists of this country considered that the establishment of such an institution as that which was proposed would conduce to their own security, welfare, and credit, as well as the public good, these advantages could only be obtained by the individual exertions and liberality of themselves; in other words, that the Society must be supported by subscription.

This fact was from the first quite clear; but it was not so clear what amount of funds would be required for the purpose, or what rate of subscription would secure the Society from the two opposite evils, of exorbitant terms, which would materially limit its influence,

and too low a subscription, which would diminish its respectability, and at the same time its means of effecting the objects desired.

After very mature deliberation, which occupied the Committee several weeks, the subscription was fixed at Two Guineas a year for Members, and One Guinea for Associates. This sum was considered to be not more than a majority of those whom it was desirable to secure on the list, would be likely to afford under the circumstances, while it was thought sufficiently high to furnish the Society with the means of effecting the objects desired. At that time, the distribution of Transactions among the Members and Associates was not contemplated, nor had any definite plan for a School of Pharmacy been decided on; but it was considered essential to raise a fund for the general purposes of the Society, and also a separate fund for the relief of distressed Members and Associates. The excitement which prevailed in the trade throughout the country, in consequence of recent events which had demonstrated the absolute necessity of a permanent union, was favourable to the attainment of this advantage, and there was every reason to believe that the possession of an available capital adequate to the several purposes in contemplation, would be the most effectual security against the diminution of our numbers, and the abatement of our zeal when the circumstances which then operated as a general stimulus might no longer exist.

This having been the policy which was acted upon at the formation of the Society, it is satisfactory to find that the result has even exceeded the expectations then entertained. It is possible that still greater success might have been secured by a modification of the proceedings in some particulars, but this is altogether a matter of speculation, and to those who complain that the policy of the Council has been too liberal, or that it has not been liberal enough (and we have heard both allegations), we can only reply by an appeal to facts.

None of the objects which were undertaken have been passed over. The union of our body has been ratified by Royal Charter. A School of Pharmacy and several branch schools have been

established. The Benevolent Fund has been gradually increasing; the total funded property of the Society amounts to above £8000; and the books, apparatus, and other property in Bloomsbury Square, are estimated at above £2000. In addition to the measures originally contemplated, a Monthly Journal has been distributed to the Members and Associates; and lastly, the Society is in possession of the machinery requisite for carrying on in a creditable manner all the scientific and other operations which, from the time of its formation, have tended to raise the professional character and increase the influence of the Pharmaceutists of this country.

If our Members and Associates in all parts of the empire had been able to observe and appreciate the change which has taken place in the position and prospects of the body during this short space of time, we feel persuaded that they would have continued cheerfully to contribute to the Institution for a few years longer the present amount of subscription. By this means we might have hoped soon to possess a Pharmaceutical College unrivalled in Europe, an advantage to which we still look forward, although at a later period. But it is not to be expected that those who are distant from the scene of action, and who are not conversant with all the circumstances of the case, can feel fully sensible of the indirect individual benefit which is likely to result from the collective elevation and improved character of the whole body; and it is not at all surprising that a desire to reduce the expense should prevail where doubts exist on this subject.

The constitution of the Society being representative, it is the duty of the Council to take into their serious consideration any question which may be brought before their notice by the Members at large, and on this account the reduction of the subscription has recently claimed their attention. In consequence of requisitions from several local Secretaries, on behalf of a considerable number of their constituents, as well as individual communications from various quarters, urging a reduction in the terms of subscription, the Council have ordered a statistical return to be made of the financial state of the Society, with a view to arrive at a correct

data as to the possibility of carrying on the affairs of the institution at the reduced rate.

We are justified in stating, on behalf of the Council, that a sincere desire prevails to meet the wishes of the Members, and if this reduction can be made without materially lessening the usefulness of the Society, they will rejoice in being able to make an alteration which appears to be increasingly called for. It is possible that an accession of Members might be the result, which would more than compensate for the reduction in the amount from each; but it is not safe to make our calculations on a speculation of this kind, and the question to be decided is, Can the Society be conducted on the reduced terms with the present number of supporters? This is the question which has been very diligently canvassed and deliberated on by the Council, and it appears to be the opinion of the majority that the experiment may safely be tried.

It is therefore proposed to reduce the Subscription for Members in London to One Guinea and a Half; in the Country, One Guinea; Associates in Town and Country, Half-a-guinea. The Journal to be distributed as before; but the Annual Grant to the Benevolent Fund, the Grants to Country Schools, and a few other expenses of minor importance, must inevitably be suspended, and the greatest economy must be observed in every department. It has been calculated that by this means the most important objects of the Society may continue to be carried on, and thus the interest which at present exists in its operations may be kept up. As the influence of the Society increases, we may expect also an increase in the number of Members and Associates, especially when the amount of subscription is reduced; so that we may hope this change will ultimately tend to advance the objects in view, by extending the field of operations, and increasing the number of supporters.

The diminution in the resourses of the institution at the present time is to be regretted on account of the Benevolent Fund, which the Council had hoped to see in a flourishing condition

before any alteration took place in the Subscription. This object, as well as the enlargement of the Laboratory department, must now be chiefly dependent on the support which may be furnished from other sources, as the general funds, with our present number of subscribers at the reduced rate, will be inadequate to any extensive outlay.

We have heard it remarked, as an objection to the proposed reduction of the Subscription, that new subscribers will have an advantage over those who have supported the Society from the beginning on the old terms. The objection may be partially removed by demanding an entrance-fee from future candidates—we say partially, because if a fee were demanded equivalent to the total amount which has been paid by the "Founders," it would probably deter the majority from coming in, and thus defeat its object. The question for Members to consider is, *Will it advance the interests of the Society, and benefit the Members and Associates individually and collectively, to reduce the Subscription?* If this be answered in the affirmative, it would be impolitic to forego the advantage ourselves, lest it should be shared by others. We offer no opinion on the subject. The proposition to reduce the Subscription did not emanate from us or from the Council, but from the Members at large who have called upon the Council to make a a reduction; and we sincerely hope the result will prove that this appeal has not been unadvisedly complied with.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF THE INTRODUCTORY LECTURE

Delivered at the opening of the Third Session of the School of Pharmacy.

BY GEO. FOWNES, PH.D.

Mr. Fownes, in delivering the introductory lecture, took occasion to notice, in the first instance, the hitherto successful working of the establishment, and the very creditable acquirements of the pupils as evinced by the excellence of the answers of the candidates for honourable distinction at the close of the last session. A new feature of very great importance, viz., facility of acquiring a knowledge of the practical operations of Pharmacy and the principles upon which they depend, had just been added; similar facilities in regard to practical scientific Chemistry, would, it was hoped, be eventually afforded upon a large and liberal scale, and a foundation laid for the establishment of a school of British Chemistry likely to do honour to the country, and remove part of the reproach under which we have long laboured.

The immediate subject of the lecture was the nature of the connexion between Chemistry and the different physical sciences, having therewith relations of a more or less intimate nature. The general characters of chemical phenomena were pointed out and contrasted with those presented by purely physical changes, and chemical attraction, in virtue of which these phenomena occur, was defined to be a "power capable of generating new bodies, whose properties are in the majority of instances completely at variance with those of their compounds."

The leading phenomena of the physical sciences were thus adverted to:—Electricity, as excited by friction of glass against metal, &c., or by chemical action, and by other means; the identity of the power, however produced—Magnetism, with its laws of polar attractions and repulsions, so analogous to those of electrical action, and yet in some respects so strikingly different, were then shortly described. The attention of the audience was then for a moment directed to the subject of the cohesive forces, and their effects in crystallization, &c.

The exact nature of the relations, as at present known, between these different groups of phenomena, was then traced. The close and intimate relations of number and quantity, between electrical force and chemical action, brought to light by the admirable researches of Mr. Faraday, occupied of course a prominent place. The connexion between electricity and magnetism, between elec-

tricity and heat, and other less important matters, were explained as far as the time permitted.

The lecturer concluded by addressing the students who proposed joining his own class, and those of his colleagues, on the necessity of close and attentive study, and especially of careful perusal of some good work on the subject of the course they were attending.

PHARMACEUTICAL MEETING,

OCTOBER 9th, 1844,

MR. JOHN SAVORY, PRESIDENT, IN THE CHAIR.

ON THE SOLUBILITY OF LEAD IN WATER.

BY MR. J. C. CALVERT.

Having read an article in a recent number of the *Pharmaceutical Journal*, on the Presence of Lead in Water, I beg to lay before the Members of the Society the result of some experiments which I have made with reference to this subject.

If some portions of sheet-lead free from oxide be put into two stoppered bottles, one of which contains recently distilled water, and the other common water, the water of the Seine for example, the lead of the first bottle soon becomes tarnished and covered with a white layer, consisting probably of carbonate of lead, whilst the metal in the second bottle will not undergo the action of the water, and of the solid and gaseous substances contained in it, till after a much longer lapse of time. Besides, the distilled water will assume a milky appearance in a few minutes, and will contain a considerable portion of lead after some hours, whilst ordinary water will remain perfectly limpid, and will present a colour scarcely perceptible on the addition of hydrosulphuric acid after the same number of hours, from three to twelve for instance.

The above facts will become still more interesting when we shall become capable of ascertaining the entire influence which salts dissolved in water may exercise in the non-alteration of lead by water. The action of the salts is so great, that Seine water and well-water never contain so many soluble and insoluble compounds of lead as distilled water. Having placed, about a year ago, some well-scoured portions of lead in some stoppered bottles, and having filled these bottles with recently distilled water, with aërated distilled water, with Seine water, and lastly with waters from several wells and springs in Paris, they presented the following results:—A few days ago, after employing sulphuretted hydrogen, distilled water and aërated distilled water presented an intensely black colour of sulphuret of lead, whilst the Seine and the spring waters presented but a very light tint.

The distilled water which I employed was quite free from hydrochloric acid; it was obtained from an alembic which continues in action for sixteen hours without its being necessary to renew the water, and it is well known that the hydrochloric acid is not formed till the termination of the operation, when the chloride of magnesium, becoming deposited on the sides of the still, is decomposed into magnesia and hydrochloric acid. That common water should retain less of the lead salts is not surprising, because it may be admitted, that containing soluble sulphates, carbonates, and chlorides, insoluble salts of lead are produced, to which some sulphur might be united, which may have been formed by the action of the organic matters on the sulphates, and the insoluble salts so deposited on the surface of the metal, might prevent the ulterior action of the liquid on it.

I also remarked a considerable difference in the quantity of sulphuret of lead formed in river-water and spring-water, when tested with sulphuretted hydrogen. This induces me to think that the nature and quantity of the salts contained in the waters exert considerable influence on the proportion of lead which the waters are capable of dissolving. After the above observations, I am satisfied that the action of water on lead depends principally on the quantity of salts which it contains. Likewise, there must exist a ratio between the quantities of salt and of water, in order that the action of the latter may be at the minimum, so that there is a limit where the water containing determinate proportions of salt of the same nature, or of different composition, must exert, its minimum effect; thus these limits and relations being once passed, or fallen short of, the action of the water increases, and is capable of becoming charged in greater quantity with soluble compounds of lead.

I also remarked, that the portions of lead which had been in contact during a year with distilled water, were covered with a white crust, whilst the lead acted on by drinkable waters presented a black surface.

ON THE MOTH

ON WHOSE LARVA

THE NEW ZEALAND *SPHÆRIA ROBERTSII* GROWS.

BY JONATHAN PEREIRA, M.D., F.R.S.

In a paper published in the second volume of the *Pharmaceutical Journal*, on a remarkable Chinese article of the Materia Medica, called "*The Summer-plant-winter-worm*," I noticed a production of a somewhat similar nature from New Zealand, consisting of a fungus, called *Sphæria Robertsii*, growing on the larva of a lepidopterous insect.

At the time of the publication of this paper, I was unacquainted with the name of the insect on which the New Zealand Sphæria is produced. Dieffenbach, in his *Travels in New Zealand*, published last year, suggested that it was a species of sphinx which feeds on the sweet potato. But the absence of any spine or horn on the last segment of the caterpillar appeared to be a strong objection to Dieffenbach's suggestion; and I stated that Mr. E. Doubleday, of the British Museum, was of opinion that the insect was the *Hepialus virescens*, the larva of which appeared to be identical with the New Zealand one.

Through the kindness of my friend and former pupil, Mr. C. J. Freeman, now of Valparaiso, I have recently obtained the insect in its perfect or imago state, and find that it is, as Mr. E. Doubleday supposed it was, the *Hepiolus virescens*.

The following description of the insect has been kindly furnished by Mr. E. Doubleday:—

"When describing, for the Appendix to Dr. Dieffenbach's *Travels in New Zealand*, the *Lepidoptera* collected there by Dr. A. Sinclair, I was induced carefully to examine the larva upon which the *Sphæria Robertsii* occurs; and was soon convinced that it was the larva of the *Zeuzerides*, and probably allied to the genus *Hepiolus**. In opposition to this Dr. Dieffenbach asserted that it was the larva of a species of sphinx found on the sweet potato; and much to my annoyance, inserted a note to this effect in the second volume of his work, in place of a remark which I had made, that 'probably the larva on which the *Sphæria Robertsii* was parasitical, was that of *Hepiolus virescens*,' a moth which I have described from a specimen in the British Museum, and from a drawing made by Dr. Dieffenbach at Waitemata, being the only large *Zeuzeride* from New Zealand with which I was acquainted.

"Soon after the publication of Dieffenbach's book, I acquired the certainty that the sphinx in question belongs to the same group as our *Sph. convolvuli* and the American *Sph. cingulata;* and that its larva, as I well knew from analogy, in no respect resembled that upon which the *Sphæria* is found. Of this the Museum, at the same time, received a fine specimen, unattacked by the parasite; and from this, my previous conjecture acquired additional confirmation.

"The moth which Dr. Pereira has received from New Zealand, as the one on whose larva the *Sphæria* is found, proving to be

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* Authorities differ as to the spelling of this word: Fabricius, Latreille, Cuvier, Stephens, Curtis, and others, have it *Hepialus;* but Illiger, whose opinion Mr. E. Doubleday follows, spells it *Hepiolus,* being derived from the Greek ἡπιολυς.

H. virescens, now leaves no doubt on the subject. Unfortunately, as with the Museum specimen, the antennæ are wanting. Probably it would not have the moniliform antennæ of our European *Hepioli*, but the bipectinate ones of the Australian group, to which belong the *Cossus labyrinthicus* of Donovan, and the *Hepiolus lignivorus* of Lewin, which are congeneric. These moths, both in the structure of the perfect insect and in their lignivorous larvæ, approach nearly to the genus *Cossus*, and must ultimately be formed into a separate genus, allied, by the form of the wings, to *Hepiolus*, especially to the very large species from the north of Canada, and to *Cossus*, especially the American type, by the antennæ. Our knowledge of the exotic nocturnal *Lepidoptera* is not sufficient as yet to enable us safely to characterize many genera. I, therefore, thought it most prudent to leave this insect provisionally in the genus *Hepiolus*, and from its greenish colour, gave it the name of *Hep. virescens*.—(See *Dieffenbach's Travels*, ii. 248)."

Hepiolus virescens.

Mr. Freeman procured the moth when at New Zealand, a few months since, from Mr. Halswell; and he tells me that it was the only one that had been procured. He adds, that "the caterpillar has never been seen alive with the fungus upon it, and it is only found in the northern part of the north island of New Zealand. I saw Mr. Swainson, of New Zealand, upon the subject. His son, Mr. W. Swainson, has been there, and procured two caterpillars, but no moth. I endeavoured to get a caterpillar without the fungus, but without success.

47, *Finsbury Square*,
Oct. 1844.

THE DECOMPOSITION OF THE CHLORIDES OF IRON

WITH SOME REMARKS ON THEIR PREPARATION.

BY MR. RICHARD PHILLIPS, JUN.

In the June number of the *Pharmaceutical Journal*, I ventured to bring forward some opinions regarding the decomposition of iodide of iron; and it then occurred to me, if my views were correct, that on account of the analogy of the action between iodine and chlorine, a similar decomposition would occur in the chlorides of iron.

Now, as my object was to prove that solutions of the above preparations as they became decomposed became acid, it was necessary for me of course to employ some process by which during their formation no acid should be present. With regard to the protochloride, I was unable to do so by any of the usual methods; I therefore substituted for them one on the principle proposed by Dumas for the preparation of chloride of copper, namely, that of mixing sulphate of copper with chloride of calcium, evaporating the mixture down to dryness without exposure to air, and redissolving in alcohol: the sulphate of lime formed, being insoluble in the latter, was left, and the protochloride of copper remained in solution. When this process is carefully conducted, it yields a protochloride but very slightly acid. With regard to the chloride of calcium employed, it being one of the preparations of the Pharmacopœia, I shall not, perhaps, be thought deviating from the subject of this paper if I remark, that by the process given in the Pharmacopœia it is ordered to be fused, and poured on iron plates. During this operation, however, hydrochloric acid fumes are given out, and the fused chloride of calcium is alkaline to turmeric paper; the decomposition being, according to Liebig, that a subchloride of calcium is formed. As, however, chloride of calcium loses the whole of its water at a temperature of about 500″, without decomposition or fusion, it is, perhaps, better not to employ a greater heat.

I substituted, however, in the preparation of the protochloride of iron, chloride of barium for the chloride of calcium, when, although the same decomposition ensued, the sulphate of barytes formed being insoluble in water, the necessity of evaporation to dryness and of the use of alcohol was done away with.

The preparation of the per- or sesquichloride has so lately been brought before the readers of the *Pharmaceutical Journal*, that I shall merely mention, that for these experiments it was prepared by passing dry chlorine-gas over heated iron-filings; great care must, however, be taken that not only the chlorine, but the iron

be perfectly dry, as if any water be present it is decomposed, and a protochloride formed.

Solutions of the above preparations were made, and exposed to the action of the air, in water, alcohol, and syrup. In water they were readily decomposed, yielding an acid solution from the formation of hydrochloric acid (in the same manner as, when iodide of iron is decomposed, hydriodic acid is formed) and sesquioxide of iron; but there was one difference between them, viz., that when the protochloride was decomposed (it consisting of one atom of chlorine and one atom of iron), only one atom of water was decomposed to form hydrochloric acid and protoxide of iron; and therefore, the oxygen of the air was necessary to convert the latter into sesquioxide, in which form it precipitates; whilst in the perchloride (it being composed of an atom and a half of chlorine, and one atom of iron) an atom and a half of water was decomposed to form hydrochloric acid, and the sesquioxide of iron was precipitated without exposure to the air. In alcohol the same decomposition occurred, although not so readily as in water; but in syrup, even when kept for some time, both preparations remain unchanged.

The protochloride has not yet, I believe, been employed as a medicine, no reason, however, existing that I am aware of, against its use, but its ready decomposition. Now, as we know, in the case of the protocarbonate, a proto-salt of iron is a most valuable medicine, might it not in the form of a syrup be introduced with advantage? it has no very unpleasant taste, and would not require any excess of acid to hold it in solution. I have therefore prepared a sample of it made by the action of hydrochloric acid on iron filings, the solution being then filtered and mixed with the syrup. It contains ten grains of iron in a fluid ounce, being about one-half the strength of the tincture of the sesquichloride.

From what I have stated of the decomposition of the perchloride, it will be seen that the excess of acid now ordered in the tincture is absolutely necessary to hold the iron in solution. As this, however, has been thought to be an objection to its use, might not a syrup of it also be employed? I have formed one by the action of hydrochloric acid on the sesquioxide of iron, no excess of acid being used. It is, like the syrup of the protochloride, of one-half the strength of the tincture. The following are the formulæ;—

SYRUP OF PROTOCHLORIDE OF IRON.

Take of	Iron Turnings	200 grains
	Hydrochloric Acid, Sp. g. 1.16	800 grains
	Distilled Water	3 fl.oz.
	Syrup	16 fl.oz.

To the iron turnings add the water and acid previously mixed; heat until all action has ceased; filter the solution into the syrup. Mix, and keep in a stoppered bottle.

SYRUP OF THE PERCHLORIDE OF IRON.

Take of Sesquioxide of Iron ..... 286 grains.
Hydrochloric Acid .....1200 grains.
Sp. G. 1.16.
Distilled Water ..... 2 fl.oz.
Syrup ..... 16 fl.oz.

Boil the sesquioxide of iron with the water and acid, previously mixed; and when dissolved, mix with the syrup. It is sometimes, however, necessary to add, to dissolve the sesquioxide of iron, more acid than is here mentioned, from its evaporation by the heat employed.

It having been arranged that the distribution of the Prizes in the Botanical Class should take place on this occasion, the Chairman requested Dr. A. T. Thomson, the Professor of Botany, to favour the Meeting with his Report, which he accordingly read as follows:—

The lecturer on Botany has much satisfaction in reporting the advantages derived from the mode of teaching the branch of natural science confided to him in the last summer session.

In the first division of the course, the lectures were delivered in Bloomsbury Square; but every morning in which no lecture was delivered, the lecturer met those pupils who chose to attend in the Royal Botanic Garden, Regent's Park; where a familiar and conversational demonstration of the medical and indigenous plants in flower at the time, was given. The number of students that attended daily varied from twelve to eighteen. The following were the proceedings adopted in these meetings:—

Several plants were examined as they grew, and their physiognomy or natural aspect in that state pointed out to the student, in order to enable him to recognise the plant, independently of its botanical characters, when it presented any peculiarities; such, for example, as distinguish the genus Datura, Atropa, Ricinus, and many others. The more general botanical characters, those which placed the plants under the particular order of the natural system to which they belonged, were then examined; and these compared with the descriptions in Lindley's Synopsis, which was chosen as the text-book for British plants. A few plants were next gathered; and the lecturer, accompanied by the students, seated round a table in a tent, examined them in detail, so as to make out the genera and species, and to familiarize the student with the best method of examining plants.

These proceedings, with an occasional examination of the hothouse and greenhouse plants, usually occupied the meeting from half-past seven until nine o'clock; and the lecturer could not feel

a higher gratification than in observing the rapid progress in the recognition of the plants, which this method of teaching produced: as a proof of which, it will be seen in the report of the *vivâ voce* examination for the prizes, that nineteen of the twenty plants presented to the six candidates, were named and described by three of them, and twelve by another of the candidates. The lecturer has only to lament that so few of the pupils were candidates for the prizes, as he is well assured that many of those whom diffidence prevented from coming forward, would have stood very high.

The last division, the Systematic Botany, was lectured upon in a tent in the garden, a method which enabled the lecturer to lay before each student a fresh-cut specimen of each of the plants requisite for illustrating the lectures. These lectures, as well as those delivered in Bloomsbury Square, were well attended; and the lecturer had every reason to be satisfied with the conduct, attention, and general progress of the students. He is convinced that, were nothing gained in this course except by those who attended the morning conversations, the impulse which is likely to be given by those students who took an ardent interest in the science, to others, will be productive of much good. The beneficial influence of emulation is not confined to those only in whom it exists, but it extends around them, by the force of example, to a considerable distance: indeed, it is well known, that the character of Universities and Colleges, at different periods, often depends less on the professors than on a few young men, giving a vigour and energy to others who, but for their following of the example thus set to them, would sink into listlessness and idleness.

With respect to the examination for the prizes, besides the printed questions, twenty plants were placed before the candidates in rotation, to be named and described. These were, in

The Order RANUNCULACEÆ—Aconitum *paniculatum.*

ROSACEÆ—Potentilla *tormentilla.*—Agrimonia *eupatoria.*

UMBELLIFERÆ—Coriandrum *sativum.*

RUBIACEÆ—Crucianella *pubescens.*

VALERIANACEÆ—Valeriana *officinalis.*

COMPOSITÆ—Anthemis *nobilis*—Cnicus *benedictus*—Cichorium *intybus*—Cichorium *endiva*—Lactuca *sativa.*

CONVOLVULACEÆ—Ipomæa *bicolor.*

SOLANACEÆ—Datura *stramonium*—Solanum *dulcamara*—Atropa *belladonna*—Nicotiana *Tabacum.*

URTICACEÆ—Humulus *lupulus.*

SCROPHULARIACEÆ—Gratiola *officinalis.*

EUPHORBIACEÆ—Euphorbia *cyparissias.*

RUTACEÆ—Ruta *graveolens.*

Leaves of Digitalis *purpurea* and of Verbascum *thapsus* were also placed before them.

Of these plants Mr. H. Lethbridge named and described 19; Mr. John Horncastle 19; Mr. Henry O. Huskison 19; and Mr. Joseph Ince 12. Each of these students also readily distinguished the leaves of the Digitalis from those of the Verbascum.

The following are the printed questions:—

1. Point out the distinction between *roots*, *rhizomes*, *tubers*, *cormi*, and *bulbs*; and describe the nature of each of these organs. 10

2. Describe the more common forms of inflorescence, namely, the *spike*, *spadix*, *catkin*, *raceme*, *umbel*, *corymb*, *cyme*, and *panicle*. 10

3. What is the distinction between *ovules*, *seed*, and *sporules*? 9

4. What is the nature of vegetable respiration? 15

5. To what order in the natural system, does the following description refer?—in what class and subclass is the order found?—and under what group and alliance of the subclass?

Plants, herbaceous or shrubby; *leaves* alternate, sometimes double or collateral. *Inflorescence* axillary, but in some instances out of the axilla. *Flowers* on pedicels without bracts, symmetrical: *calyx*, 4 or 5 parted, inferior, persistent: *corolla* regular; in some instances unequal; monopetalous, hypogynous; limb 5-cleft, rarely 4-cleft; deciduous; æstivation, plaited in the genuine genera of the order; in the spurious, imbricated. *Stamens* inserted upon the corolla, alternate with the segments of the limb: one stamen sometimes abortive. *Ovary*, 2 or 4-celled, a capsule with a double dissepiment parallel with the valve; or a berry with the placenta adhering to the dissepiment. *Pericarp* 2 or 4-celled: seeds numerous, sessile, with the embryo in fleshy albumen. 30

6. Name the medicinal plants in the order 5

On examining the replies delivered in writing to the printed queries, the competitors stood in the following order; the sums mentioned indicating the value of their papers. The student whose motto is

Myosotis	75.
Perseverando...	69.
At secura quies	66.
Juvenis	64.

It is unnecessary to mention the others. The first, therefore, if he stand equally high in the *vivâ voce* examination, will be the successful candidate for the first prize; and on the same principle the second will be adjudged.

In concluding this report, the lecturer cannot avoid remarking that he trusts the Society will see the great advantage of delivering instructions on Botany in a Botanic Garden—it is nearly equivalent to botanical excursions; and he trusts the Society will continue the plan thus happily commenced, more especially if it again confides to him this division of the excellent elementary instruction which it has arranged for its pupils, and which is so well adapted for elevating the character of British Pharmacopolists, and promoting the good of the public.

The sealed papers being opened, MYOSOTIS was found to be the motto of Mr. HORNCASTLE, of 221, Tottenham Court Road, who was accordingly entitled to the FIRST PRIZE.

PERSEVERANDO being the motto of Mr. LETHBRIDGE, 2, Clarke's Place, Islington, the Second Prize was awarded to him.

Certificates were adjudged to Mr. HOWDEN, and Mr. H. O. HUSKISON.

The Chairman, after having distributed the prizes, observed, that before concluding the meeting, he thought it right to offer a few remarks on a recent melancholy event. It had afforded him much satisfaction to take a part in the proceedings of the meeting which was the first of the session, and to hear so favourable a report of the progress of the School of Pharmacy; but while he could congratulate the Members on the advancement the Society had made, and the spirit with which its various operations appeared to be carried on, these agreeable feelings were mingled with others of a more painful character, when he recollected who had filled the chair on the last occasion on which the distribution of prizes had taken place in that room.

The decease of Mr. PAYNE, the late President of the Society, had been announced to the Members, but he considered it to be his duty, in his official capacity, and the duty of the Society as a body, to notice in a public manner this severe loss which they had sustained. Mr. Payne was the most indefatigable Member of the Society, a zealous supporter of the independence and established privileges of the Chemists and Druggists—his heart and soul was with them, and he laboured day and night for the success of the Society. At the formation of the institution, Mr. Payne had not a great name to lend to it, being a man but little known; but his clear sound reasoning, his good judgment, and his unvarying kindness to every Member, raised up for him a name which will not soon be forgotten. The Chairman trusted the Members generally would unite with the Council in awarding a testimony of grateful acknowledgment to the memory of the late much respected and lamented President.

THE SCIENTIFIC RESEARCHES OF THE LATE DR. DALTON.

It was the opinion of Dr. Dalton himself that his success and reputation as a philosopher, resulted not from any superiority in his intellectual powers, but from the habits of industry and method with which he pursued science during a long series of years —noting down in his course the facts which presented themselves to his mind, and thus becoming possessed of a vast store of information, from which, by a simple process of reasoning, he was enabled to arrive at new and satisfactory results. Making due allowance for the modesty which induced him to underrate the abilities with which he was gifted, there can be no doubt that Dr. Dalton was right in attributing much of his success to his indefatigable perseverance and industry. It has been stated by a person acquainted with his habits, that "so little was there of incident in the calm and even tenor of his private life, that the journal of yesterday was the journal of to-day; the same of his public life—for his public life was in his laboratory." His reading was probably not so extensive as that of some of his cotemporaries, but his constant intercourse with bleachers, dyers, calico-printers, and persons engaged in various arts practised in his district, together with his own endless observations and researches, placed him in possession of an immense stock of useful and practical knowledge.

In early life he was much interested in the study of Metereology, a subject which, at that time, was not very popular, and was but little understood. His first publication of an important character was the *Meteorological Observations and Essays*, which appeared in the year 1793, and which contained his observations, compared with those made in London and other places, on the barometer, the thermometer, the hygrometer, and the rain-gauge, during the interval between 1786 and 1793. He continued these observations without intermission until the last day of his life. In the year 1834, he published a second edition; and the following statement contained in the Preface is remarkable, as it shows how accurate his observations and reasonings had been from the commencement:—"It may be expected that such a lengthened series of observations as I have made since, must have afforded abundance of important matter to be added to the work: I have not found this to be the case."

Among other valuable information contained in this volume, may be mentioned the sixth essay, *On Evaporation, Rain, Hail,*

Snow, and Dew, in which he shows that the vapour of water is an independent elastic fluid; that all elastic fluids, whether alone or mixed, exist independently; that the gases constituting the atmosphere are not chemically combined, but merely mechanically mixed: that there are, in fact, four distinct and separate atmospheres—oxygen, nitrogen, carbonic acid gas, and steam; that one sort of gaseous fluid offers no obstruction to the passage of another sort through it, except as the stones in the channel of a stream oppose the flow of running water; that evaporation and the condensation of vapour are not the effects of chemical affinities, but that aqueous vapour always exists as a fluid, *sui generis*, diffused among other aërial fluids, and that a given quantity of air, whatever be its density, will, at a given temperature, be capable of absorbing the same constant weight of vapour.

In the year 1802, several papers by Dr. Dalton, were published in the *Memoirs of the Literary and Philosophical Society of Manchester*, and among them the most important was one, entitled "Experimental Essays on the Constitution of mixed Gases—on the Force of Steam or Vapour from Water and other Liquids, in different temperatures, both in a Torricellian Vacuum and in Air—on Evaporation, and on the Expansion of Gases by Heat." The conclusion to which he arrived in this essay was, that when two or more gases are mixed, the particles of each gas repel each other; but the particles of one gas do not repel the particles of another gas. In this way he accounted for the fact, that if two gases be placed at rest in different vessels communicating with each other by means of a tube, both gases become, after a certain interval, equally diffused through the two vessels. The idea caused some little excitement among Chemists at the time, being at variance with generally received opinions; but it is now generally admitted to be correct.

For many years Dr. Dalton paid a periodical visit to his native mountains of Cumberland and Westmoreland, where he pursued his philosophical researches on the constitution of the atmosphere. During these excursions he generally ascended Helvellyn and Skiddaw, from the double impulse of gratifying his ruling passion for enquiry, and his ardent admiration of nature. On one of these tours, in early life, he spent a day with the celebrated James Watt, a circumstance of which he ever afterwards entertained and expressed a pleasing recollection.

The instruments with which Dr. Dalton carried on his experiments, were of the simplest description. In his early researches, his hygrometer was a piece of whipcord, and the barometer which he used to the time of his death, was made by himself many years ago. It has an antiquated appearance, and besides the original scale, which is almost obliterated, there is a

paper one pasted on the frame by the side of the tube. On an inner wall hung a thermometer, corresponding in its primitive appearance with the barometer, and he had another thermometer outside the window, suspended in such a manner, that by holding a candle close to the glass inside, the graduations could be seen without opening the window. With this apparently rude and simple, but really exact apparatus, Dr. Dalton made upwards of 200,000 observations during the space of above half a century, the record of which he recently presented to the Manchester Literary and Philosophical Society. The book which he kept for registering these observations, was ruled in ten columns as follows, the entry given below being the last which he made, on the day before his decease :

Day of the Month.	Hour.	Therm. in.	Therm. out.	Barometer.	Wind.	Strength.	Rain.	Evap.	Remarks.
July 26	8	65	75	30.03	S.W.	I.			
"	13	65	73	30.10	Sy.	I.	Little Rain.		
"	21	60	71	30.18	S.W.	I.			

In the column for the hour, the figures 13 and 21 denote one o'clock and nine p.m, counting from midnight. The second entry in the column for wind was indistinct, and might be Sy or S.W. imperfectly formed. The seventh column, indicating the strength of the wind, was usually regulated as follows, according to Dr. Dalton's language and scale, 0 denoting a calm, 1 a gentle breeze, 2 a fresh wind, 3 a gale, 4 a hurricane or maximum of wind. The entries in the book up to the 17th of May, the date of his most severe paralytic attack, were quite clear and distinct; but after that time, his hand became more tremulous every day, until the last day of his life.

The most important of Dr. Dalton's researches, were those upon which was founded the doctrine of definite proportionals, or the atomic theory, as it is usually termed. In order to understand the value of this discovery, and the amount of credit which is due to Dr. Dalton, it is necessary to be acquainted with the circumstances which led to its development, and the several steps by means of which Chemistry became *an exact science*.

In the year 1777, Wenzel, a German Chemist, published a work, entitled *Lehre von den Verwandschaften*, in which he showed by a series of analyses (now admitted to be remarkably accurate, although they were not much noticed at the time) that when two neutral salts decomposed each other, both the resulting compounds were exactly neutral. Richter, a Prussian Chemist, in the year

1792, got upon the same scent, and endeavoured to ascertain the relative capacities of saturation belonging to the several acids and bases, and to express them by a scale of numbers. This "table of equivalents," although it gave a clue to the facts which were subsequently developed, was nevertheless very imperfect. The number of substances included in it was very limited, and there was no allusion to the circumstance of substances combining in two or more proportions.

Mr. Higgins, formerly of Pembroke College, Oxford, afterwards Professor of Chemistry in Dublin, carried the investigation a step further, and in a work which he published in 1789, entitled *A Comparative View of the Phlogistic and Antiphlogistic Theories*, he states, that one ultimate particle of sulphur and one of oxygen constitute sulphurous acid; whilst one of sulphur and two of oxygen constitute sulphuric acid; and moreover, that in the compounds of azote and oxygen, the elements are to each other in the proportion of 1 to 1, 2, 3, 4, and 5, respectively. He also adhered to the corpurcular hypothesis, supposing matter to combine particle to particle, and not according to the Kantian doctrine, by the mutual penetration of one substance by another. The want of precision in chemical analysis at that time, was an obstacle to the further development of the facts which the experiments of Higgins might otherwise have enabled him more clearly to substantiate, and it remained for Dr. Dalton to reduce to a positive law the isolated and indefinite conjectures which had perplexed rather than enlightened the minds of his predecessors.

In the year 1808, he published the first volume of his *New System of Chemical Philosophy*, in which he gave a brief outline of those notions respecting the constitution of matter which had for five or six years been gradually gaining ground in his mind. The extreme accuracy with which he performed his experiments, and his perseverance in the prosecution of these researches, enabled him to prove in a manner which no longer admitted of a doubt, that the law of definite proportionals is universal. In the above work, he announces as a general fact, that when two bodies combine, the union takes place between their component particles in the proportion of one of the first to one of the second, one of the first to two of the second, one to three, and so on. He states that it is one great object of his work "to show the importance and advantage of ascertaining the relative weights of the ultimate particles, both of simple and compound bodies, the number of simple elementary particles which constitute one compound particle, and the number of less compound particles which enter into the formation of one more compound particle."

In the second volume of his work, published in 1810, he

confirmed these views by facts derived from the consideration of the compounds of oxygen with hydrogen, nitrogen, carbon, sulphur, and phosphorus, and these views have subsequently been confirmed and extended by Berzelius, Thomson, and other Chemists.

But while all philosophers agree in opinion respecting the facts which Dr. Dalton so clearly established, and on which he founded his "Atomic Theory," they are not so unanimous in admitting the correctness of his explanation of these facts: in other words, the doctrine of definite proportionals and the atomic theory are considered to involve two distinct propositions. That the proportions in which bodies combine follow a numerical law is no longer a matter of doubt: nor can it be denied, that the circumstance may be accounted for by the supposition that the union takes place between the atoms that constitute the substances, and that in each substance the several atoms are characterized by a particular weight. But the former proposition is a matter of fact, the latter is a theory; and those Chemists who are averse to speculative and theoretical notions are particularly careful to make a distinction between the two propositions, which, in Dr. Dalton's mind, were very much connected. We are not aware that any attempt has been made to disprove the theory. The objection to its adoption arises from the circumstance that it is only a theory, and that no hypothesis should be admitted, unless absolutely proved.

It is sufficient for the purposes of science to know that a law exists which regulates the proportions in which substances combine, nor does it detract from the merit of this discovery to suspend the judgment as to the precise manner in which the ultimate molecules of these substances are constituted, a subject which must remain, more or less, a matter of speculation.

ON THE ANALYSIS OF SOILS.

The following directions for selecting specimens of soil, or subsoil for analyses, are extracted from a paper issued from the Museum of Economic Geology, in the department of Her Majesty's Woods and Forests:

"Soils being generally the upper decomposed portions of subjacent mineral substances, whether hard rocks of various kinds, or clays, marls, sands, &c., mingled either naturally or artificially with vegetable and animal matter, it becomes very desirable in collecting specimens of them, that they should be accompanied by others of the hard rocks, clays, marls, sands, &c., on which they rest.

"In selecting soils for analyses, care should be taken to obtain fair average specimens, and to insure the true subsoil, or subjacent hard rock, clay, sands, &c., specimens of the latter should be obtained as near as

possible beneath the spot whence the soil may have been so selected, for it sometimes happens that the soil of a field varies in places from resting upon different kinds of subsoils.

"The soil above hard rocks is not unfrequently separated from them by broken angular fragments, the half decomposed portions of such hard rocks; specimens, therefore, of subsoils, or subjacent mineral substances should, in such cases, be taken from the solid hard rocks beneath, and not from these fragments, which have commonly suffered too much decomposition to exhibit the real chemical composition of the rocks themselves.

"The quantity of soil taken as a specimen should weigh about a pound, which should be tied up in a canvass bag, and labelled.

"With respect to specimens of subsoils, if of marl, sand, or clay, portions weighing about a pound, should be tied up in a canvass bag, labelled to correspond with the respective soils above them. If the subjacent rocks be hard, a piece also weighing about one pound, and fresh broken from the body of the rock, as nearly as possible beneath the spot whence any specimen of soil may have been selected would suffice, and should be wrapped in strong brown paper, labelled to correspond with the soil above it."

The substances usually met with in soils, are silica, alumina, carbonate of lime, carbonate of magnesia, phosphate of lime, phosphate of magnesia, phosphate of alumina, phosphate of iron, peroxide of iron, oxide of manganese, sulphate of lime, salts of potash and soda, and organic matter.

Some of these are often absent, and the determination of others may sometimes be deemed superfluous; nevertheless, it is our wish to make the process sufficiently complete to meet all ordinary cases.

(1.) The first step in the process is, properly to dry the specimen to be analyzed over a water-bath, at 212° Fahr.; a higher temperature than this should not be used, as it might cause the decomposition of some of the organic matter. The dried specimen is to be powdered, sifted through a lawn sieve, well rubbed in a mortar so as to ensure the uniform admixture of all the parts, again dried over the water-bath, and put into a stoppered bottle.

(2.) Five hundred grains of the dried specimen are to be spread out on a sheet of writing paper, and exposed to the air for twelve hours; then weighed, and the increase of weight, if any, noted. The absorption of moisture from the air, if it take place to the extent of 7 or 8 grains in the above quantity, may be considered a favourable indication.

(3.) One hundred grains of the dried specimen are to be introduced into a previously counterpoised bottle, containing hydrochloric acid, with the usual precautions; and when action has ceased, the amount of loss determined, which will be the carbonic acid resulting from the decomposition of the carbonates.

(4.) Two hundred grains of the dry specimen are to be put into a platinum crucible, and exposed to a red heat, being occasionally stirred, until on cooling it assumes a reddish appearance through-

out. It is again to be weighed, and divided into two equal parts.

(5.) One of these parts is to be introduced into a counterpoised bottle, containing hydrochloric acid, and the disengaged carbonic acid estimated as before. If the quantity of carbonic acid thus deduced be less than that obtained before calcination, the difference must be added to the weight of the calcined product under operation, and this deducted from the weight before calcination, will indicate the amount of organic matter.

(6.) The other half of the residue left after calcination is now to be boiled in a flask with about an ounce of hydrochloric acid. By this means all the ingredients, excepting the silica and part of the alumina, will be dissolved, some of them being decomposed. The insoluble part is to be separated by filtration, washed until no longer acid, and dried. The solution, together with the washings of the insoluble powder, is to be marked *A*, and put aside for subsequent examination. The powder is to be finely powdered, and mixed with four times its weight of dried carbonate of soda; the mixture is then to be heated in a platinum crucible until it fuses into a glass. The crucible and its contents being placed whilst warm in a Wedgwood dish containing distilled water, about an ounce of hydrochloric acid is to be added, and heat applied. More acid and water may be added, if necessary, until nothing more is dissolved. This being done, the solution and insoluble part are to be evaporated to dryness, in order to aggregate the silica held in suspension; and care must be taken during this operation that no hard lumps be left in the solution, as the silica sometimes forms a coating over such particles through which the acid will not act. The residue, after the evaporation, is to be heated with water mixed with about half an ounce of hydrochloric acid; the solution is to be filtered, and the insoluble part washed. The latter is the silica, which must be carefully heated to redness, and weighed whilst warm. The solution from which the silica has been separated, is to have solution of ammonia added, which will throw down the alumina. This must be treated as the silica, and weighed.

(7.) The solution *A* is now to be examined. For this purpose, add ammonia in excess, and afterwards strong acetic acid in considerable excess, and boil the mixture; phosphate of peroxide of iron, and phosphate of alumina, if present, will be precipitated, and will remain undissolved. Collect and wash this precipitate, and label the solution *c*. Treat the precipitate with solution of caustic potash, which will dissolve the phosphate of alumina, and leave the phosphate of iron; separate, wash, dry, and weigh the latter. Add ammonia to the potash

solution to throw down the phosphate of alumina, which is in like manner to be collected and weighed.

It must not be inferred that the phosphates of iron and alumina thus obtained, existed as such in the soil. The phosphoric acid may have been, at least in part, in combination with lime or magnesia, while the iron may have been in the state of peroxide, and the alumina uncombined; but on dissolving these ingredients in the hydrochloric acid, the phosphate of lime or magnesia would be decomposed, and phosphate of iron and alumina formed.

As this decomposition would always take place under the circumstances indicated, it next becomes a question, whether the equivalent proportions of peroxide of iron and alumina, or of phosphoric acid, existed in excess. To determine this point, divide the solution, *c*, into two parts; to one add a few drops of solution of perchloride of iron, which, if any earthy phosphates still remain undecomposed, will occasion a precipitate of phosphate of iron, in which case it may be concluded that the whole of the iron originally in the solution has been obtained in the state of phosphate of iron. Continue the addition of perchloride of iron as long as a precipitate is formed, and treat this precipitate the same as that first obtained from solution *A*. If, on the other hand, no precipitate be formed from the perchloride of iron, it will be necessary to try whether there be more iron or alumina in the solution. In this case, add to the other half of the solution *c* liquid ammonia, so as to render it slightly alkaline; then add hydrosulphate of ammonia, which will throw down peroxide of iron, oxide of manganese, and alumina, if present. Collect and wash this precipitate, and label the solution *d;* dissolve the precipitate in hydrochloric acid, and boil the solution; add caustic potash in excess, which will throw down peroxide of iron, oxide of manganese, and alumina, but will again dissolve the last. The oxides of iron and manganese being removed from the solution, and ammonia added, the alumina will be precipitated. These precipitates are to be washed, dried, heated to redness, and weighed.

(8.) The quantity of manganese contained in soils is usually so small as to render its separation from the iron unnecessary. Its presence may be indicated by the black colour which the iron precipitate assumes on being exposed to the air, or by the smell of chlorine which is afforded on adding a few drops of hydrochloric acid to the precipitate. If thought desirable to separate these two oxides, let them be dissolved in hydrochloric acid, and precipitated carbonate of lime added, which will throw down the oxide of iron. Separate the precipitate; add oxalate of ammonia to the solution previously neutralized by ammonia to remove lime, and then precipitate the manganese with caustic soda. Collect, dry, and weigh this, which is oxide of manganese.

(9.) The solution *d* may still contain lime, magnesia, and salts of potash and soda. Boil this solution to drive off any sulphuretted hydrogen it may contain; add oxalate of ammonia as long as a precipitate of oxalate of lime is formed. Collect, dry, and weigh this precipitate, and label the solution *e*. If the precipitate be dried at 212° it will contain one atom of water.

(10.) Add hydrochloric acid to solution *e;* evaporate it to dryness, and heat it to a dull red heat. Redissolve it in a little water; add some red oxide of mercury; evaporate again to dryness, heat it to redness, and treat the residue with water. Pure magnesia, if present, will remain, which weigh.

(11.) The chlorides of potassium and sodium have yet to be determined as well as the sulphate of lime. Boil 200 grains of the dry specimen in ten ounces of distilled water; filter the solution, and wash the insoluble part, divide the solution into two equal parts; to one add nitric acid and then chloride of barium as long as any precipitate occurs; collect, wash, and dry this precipitate, which will be sulphate of barytes, obtained from the decomposition of the sulphate of lime. To the other half of the solution add nitric acid, and then nitrate of silver, as long as any precipitate occurs, which treat as in the former case. This will be chloride of silver, obtained from the decomposition of the chlorides of potassium and sodium.

DETECTION OF IRON BY THE JOINT AGENCY OF GALLS AND ALKALIES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

My dear Sir,—In reference to the detection of iron by the joint agency of galls and alkalies*, a chemical friend reminds me of the necessity of attending to the tints which ensue in *pure* water when so tested. The best way of avoiding this fallacy is, perhaps, to make a comparative experiment in distilled water, and in that under examination, and to use the smallest possible quantities of the respective tests. We must also in these cases take into account the effect of the presence of certain salts, and especially those of lime, upon the above tests.

Yours faithfully,

Wm. Thos. Brande.

Royal Institution, 15th October, 1844.

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* See page 78 of this volume.

GEUM MONTANUM, OR INDIAN CHOCOLATE ROOT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—When in Nova Scotia, where this plant grows wild, I procured some of the roots. They make an infusion not disagreeable in taste, are a powerful astringent, and are useful in diarrhœa, fluxes, &c. I gave what I had to a poor man labouring under an organic disease of the bladder, accompanied with hemorrhage, and he said that the infusion much relieved his pains; but whether it has any specific action, or would be more serviceable than other astringents in diseases of the bladder, further experience can alone decide. As a cheap astringent, coming from one of our own colonies, perhaps it will be found worthy of notice. I do not know whether it is admitted into the American Pharmacopœia.* I am your obedient servant,

W. Pinckard.

Towcester, October 4th, 1844.

* [No.—Ed.]

UNGUENTUM HYDRARGYRI NITRATIS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I send you a sample of Ung. Hyd. Nit. prepared strictly according to the Pharmacopœia. Hitherto I have substituted butter for lard, with the view of having the ointment of a nice consistence, having frequently prepared it according to the Pharmacopœia, without success. The sample sent, I consider the result of mere accident. I was engaged making the ointment, when two prescriptions were brought in, requiring immediate attention. I had put the whole of the quicksilver to the acid, the lard and oil I put into a pot, placed in the oven by a good kitchen fire. When I returned to finish my ointment, I found the solution (that is, the quicksilver and acid) quite cold—the lard and oil which I placed in the oven at almost boiling heat. I then added half the solution to the oil and lard at once, and the remainder in about four minutes time, promoting effervescence by well agitating it with a bone spatula. At the same time, I had not a doubt in my own mind as to its being a failure, owing to the delay by suffering the acid and quicksilver to get quite cold. The ointment has been prepared about six days.

I am Sir, your obedient servant,

C. I. F., A.P.S.

Evesham, Sept. 24, 1844.

[The ointment appears to be a very good sample.—Ed.]

ON THE ADULTERATION OF SULPHATE OF COPPER.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—For the last five or six years Agriculturists have been induced to try the effect of sulphate of copper for wetting wheat, to prevent the destruction of that grain by slugs, and the formation of an excrescence very similar to ergot of rye, which the farmers about here call bag or bladder. I am living in an agricultural district in Essex, and have had frequent opportunity of hearing the result of such trials. Many have been disappointed, and others have found it answer their best expectations. Now I think, I can in some measure account for the disappointment sometimes experienced. There is in the market a spurious article which scarcely contains 25 per cent. of sulphate of copper, being chiefly composed of sulphate of iron. This is sold by drysalters and grocers, and not unlikely by some Chemists and Druggists, the retail price being less than the genuine can be bought at wholesale. A sample of this spurious salt fell into my hands the other day, and I found it to be of very little use as an application to wheat. It could not be mistaken by any one acquainted with the characters of the genuine salt, the crystalline structure being confused and irregular, the crystals easily breaking into small roundish fragments, and the colour being a pale bluish green.

From some experiments I have performed on it, it appears to contain a large proportion of sulphate of iron.

This spurious article is to be bought at about 32*s.* per cwt., while the true sulphate of copper is worth 42*s.* per cwt.

I send you herewith a sample of the salt.

I am, Sir, yours respectfully,

Maldon. An Associate.

[We have examined the specimen of salt sent us, and find it to contain fifty-two per cent. of sulphate of iron, the remainder being sulphate of copper.—Ed.]

ON THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I consider it the moral duty of every vendor of medicine, when applied to for any one of the more potent drugs or chemical preparations, to ascertain if the applicant is acquainted with its deleterious properties,

and also that the purpose for which it is stated to be required, is a legitimate one ; having done so, should he from his knowledge of the various medicinal agents he deals in, feel assured that some less dangerous article would serve the purpose equally well, I have no hesitation in stating, that he is not only justified in refusing the one and recommending the other, but that it is his duty to do so, and were this more generally done, I am convinced that it would materially reduce the number of deaths from accidental poisoning and suicide.

The sale of arsenic for the preparation of seed-wheat will serve as an illustration of the above principle—practical experience has shown that a less dangerous salt will answer the purpose equally well, if not better. I therefore, when applied to for arsenic for this purpose, invariably refuse it, and recommend sulphate of copper, and have the satisfaction of knowing that none of my customers would now use arsenic under any circumstances.

It is much to be regretted that your correspondent has not recorded the precise locality where " the daily enormous amount of good is done to the population by the large consumption and judicious use of laudanum, prussic acid, oxalic acid, crowfig, sugar of lead, syrup of poppies, and such like drugs," as the reverse has not unfrequently been stated to prevail in other districts from the habitual use of narcotics and sedatives, and I am sure many of your readers, that were " horrified " by the mention of such an enormous weekly retail of syrup of poppies, would be equally delighted to hear the specific good result daily effected by the judicious use of it.

I now come to the " horrifying " statement which has induced me to take up this question, viz., the sale of sp. vitriol by the pint, which quantity your correspondent states, " is commonly given to horses." Can it be believed, that in the present day, with such facilities for every one to become acquainted with the action of medicines upon our domestic animals, that a man can be found who would perpetrate such an inhuman act ? Can it be possible for the stomach of an animal, peculiarly predisposed to inflammatory affections, to become so inured to such treatment as to bear it with impunity ? I have seen much mischief arise from its use by illiterate waggoners and grooms in comparative homœpathic doses, and many cases are recorded of valuable horses being destroyed by it. No veterinary author of repute recommends its administration under any circumstances,— no educated veterinarian ever administers it. It possesses no remedial advantages in the treatment of the horse over many other less deleterious agents. I would therefore exhort every member of our profession never to sell it, or any similar article, for such illegitimate purposes. Let it not be said that any Member of our Society for trifling pecuniary gain, will countenance the ignorant barbarity of the darker ages; but let us individually and collectively strive to restrain and suppress the mischievous quackery of the empiric, whether human or veterinary.

In conclusion, I would recommend to every one in the habit of supplying medicines for the horse, to add to his library *Morton's Manual of Veterinary Pharmacy*. It is a work well worthy the name of its respected author, and one from which much valuable information may be obtained. Allow me also to solicit the early publication of the promised series of articles on Veterinary Materia Medica ; they will be esteemed by many of your country readers, and by none more so than

Your obliged servant,

ALEXANDER BOTTLE.

Dover, Oct. 15, 1844.

ON THE ANALYSIS OF GUANO.

BY ANDREW URE, M.D., F.R.S., &c.

[*Continued from page* 182].

Since all these testimonies concur to place this remarkable excrementitious product in such high estimation, it becomes a paramount duty of the Chemist to investigate its composition, and to discover certain means of distinguishing what may be termed the sound or normal state of guano, from the decomposed, decayed, and effete condition. The analysis by Fourcroy and Vauquelin of a sample of guano presented to them by Baron Von Humboldt, gave the following composition in 100 parts:

Urate of ammonia	9.0
Oxalate of ammonia	10.6
Oxalate of lime	7.0
Phosphate of ammonia	6.0
Phosphate of ammonia and magnesia	2.6
Sulphate of potash	5.5
Sulphate of soda	3.3
Sal ammoniac	4.2
Phosphate of lime	14.3
Clay and sand	4.7
Water and organic matters	32.3

How different are the constituents from those assigned by Klaproth—a no less skilful analyst than the French Chemists! and how much this difference shows, not only the complexity of the substance, but its very variable nature!

The general results of an analysis by Professor Johnston, published in his paper on Guano, in the third part of the second volume of the *Journal of the Royal Agricultural Society of England*, are as follows:

Ammonia	7.0
Uric acid	0.8
Water and carbonic and oxalic acids, &c., expelled by a red heat	51.5
Common salt, with a little sulphate and phosphate of soda	11.4
Phosphate of lime, &c.	29.3
	100.0

The specimen of guano represented by this analysis must have been far advanced in decomposition, as shown by the very scanty portion of uric acid; and must have been originally impure, from the large proportion of common salt, of which I have not found above three or four per cent. in any of the genuine guanos which I have had occasion to analyze. In another sample, Professor Johnston found 44.4 of phosphate of lime, with a little phosphate of magnesia, and carbonate of lime. These results resemble, to a certain degree, those which I have obtained in analyzing several samples of Chilian and African guanos, especially in the predominance of the earthy phosphates. The proportion of ammonia which can be extracted by the action of hydrate of soda and quicklime, at an elevated temperature, is the surest criterion of the soundness of the guano; for by this process we obtained not only the *ready-formed* ammonia, from its several saline compounds, but also the ammonia producible from its uric acid, and undefined animal matter. These two latter quantities have been hitherto too little regarded by most analysts, though they constitute the most durable fund of azote for the nutrition of plants. Uric acid and urate of ammonia, which contains $\frac{10}{11}$ths of uric acid, being both nearly insoluble in water, and fixed at ordinary temperatures, continue to give out progressively to plants in the soil, the azote, of which they contain fully one-third of their weight. Under the influence of oxygen and a certain temperature, uric acid passes through a very remarkable series

of transformations; producing allantoin, urea, and oxalic acid, which eventually becomes carbonic acid. These changes are producible immediately by the action of boiling water and peroxide of lead. From these metamorphoses we can readily understand how so much oxalate of ammonia and of lime is reported in many analyses of guano, though none, I believe, is to be found in the normal state, as it is occasionally imported from the Chincha Islands and Bolivia; nor were any oxalates found in the dung of the gannet, as analyzed by Dr. Wollaston, or of the sea-eagle, according to the following analysis of Coindet:—Ammonia, 9.21 per cent.; uric acid, 84.65; phosphate of lime, 6.13 = 100. The Peruvian sea-fowl, by feeding exclusively on fish, would seem to swallow a large proportion of earthy phosphates; since, in the purest guano that has come in my way, I have found these salts to amount to from 12 to 15 per cent.

Dr. Von Martius proposes to use the degree of solubility of the guano in water as a good criterion of its quality; but this is a most fallacious test. Sound guano contains from 20 to 25 per cent. of insoluble urate of ammonia; nearly as much undefined animal matter, along with from 15 to 20 of earthy phosphates; leaving no more than 50 or 55 per cent. of soluble matter, exclusive of moisture; whereas decayed guano yields often 60 or 70 per cent. of its weight to water, in consequence of the uric acid and animal matter being wasted away, and the large portion of moisture in it, the latter amounting very often to from 25 to 35 per cent. The good Peruvian guano does not lose more than from seven to nine per cent. by drying, even at a heat of 212° F.; and this loss necessarily includes a little ammonia. Each analysis of guano executed for the information of the farmer should exhibit definitely and accurately to at least one per cent.:

1. The proportion of *actual* ammonia.
2. The proportion of ammonia producible also from the uric acid and azotized animal matter present; and which may be called the *potential* ammonia. This is a most valuable product, which is, however, to be obtained only from well-preserved dry guano.
3. The proportion of uric acid, to which, if $\frac{1}{11}$th of the weight be added, the quantity of urate of ammonia is given.
4. The proportion of the phosphates of lime and magnesia.
5. The proportion of fixed alkaline salts, distinguishing the potash from the soda salts; the former being more valuable, and less readily obtainable: the latter can be obtained by the use of common salt. Wheat, peas, rye, and potatos require for their successful cultivation a soil containing alkaline salts, especially those of potash.
6. The proportion of sandy or other earthy matter, which in genuine guano, carefully collected, never exceeds two per cent., and that is silica.
7. The proportion of water, separable by the heat of 212° F.

The farmer should never purchase guano, except its composition in the preceding particulars be warranted by the analysis of a competent Chemist. He should cork up in a bottle a half-pound sample of each kind of guano that he buys; and if his crop should disappoint reasonable expectation, he should cause the samples to be analyzed; and should the result not correspond to the analysis exhibited at the sale, he is fairly entitled to damages for the loss of his labour, rent, crop, &c. The necessity of following this advice will appear on considering the delusive, if not utterly false, analyses under which cargoes of guano have been too often sold. In a recent case, which came under my cognizance in consequence of having been employed professionally to analyze the identical cargo, I found the guano to be nearly rotten and effete; containing altogether only $2\frac{1}{2}$ per cent. of ammonia, $\frac{1}{2}$ per cent. of urate of ammonia, nearly 9 of sea-salt, 24 of water, and $45\frac{1}{2}$ of earthy phosphates. Now, this large cargo of many hundred tons, fetched a high price at a public sale, under the exhibition of the following analysis:

Urate of ammonia, ammoniacal salts, and decayed animal matter	17.4
Phosphate of lime, phosphate of magnesia, and oxalate of lime	48.1
Fixed alkaline salts	10.8
Earthy and stony matter	1.4
Moisture	22.3
	100.0

The purchasers, I was told by the brokers, bought it readily, under a conviction that the guano contained 17.4 of ammonia, though the proportion of ammonia is not stated.

By the following hypothetical analysis much guano has been well sold: "Bone earth, 35; lithic acid, &c., 15; carbonate of ammonia, 14; organic matter, 36 = 100." I am quite certain that no sample of guano can contain 14 per cent. of carbonate of ammonia—a very volatile salt. We shall see presently the state of combination in which the ammonia exists. It may contain at the utmost five per cent. of the carbonate; but such guano must have been acted upon powerfully by humidity, and will, therefore, contain little or no uric acid.

In the very elaborate examination of guano by T. Oellacher, apothecary at Innsbruck, published in a recent number of Buchner's *Repertorium of Pharmacy*, it is said, that if a glass-rod dipped into muriatic acid be held over guano, strong fumes are developed; and the solution of guano has an alkaline reaction with litmus paper. These phenomena evidently indicate the presence of carbonate of ammonia, and of course a partially decomposed guano; for sound Chincha and Bolivian guano have an *acid* reaction, proceeding from the predominance of phosphoric acid. Farmers frequently judge of the goodness of guano by the strength of the ammoniacal odour; but in this judgment they may egregiously err, for the soundest guano has no smell of ammonia whatever; and it begins to give out that smell only when it is more or less decomposed and wasted.

(To be continued.)

EXAMINATION OF COFFEE-SEEDS.

BY DR. F. ROCHLEDER.

Liebig's views of the process of nutrition have given additional interest to every analysis of articles of food. An aqueous solution of coffee is used in nearly every country as beverage, and still it is not yet certain whether it should be regarded as an article of nutrition or merely as a medicament. Of course this point cannot be settled without an analysis of the beverage. A close examination of the raw seed, from which it is prepared, must be the introduction to this chemical analysis, in order to make us acquainted with the substances it contains previous to the alteration effected by the roasting.

Of all the substances contained in the raw seeds, we are at present only acquainted with caffëine, although the seeds have been frequently subjected to analysis. The reason of this principle being more especially known, as regards its properties and composition, must be sought in the facility with which it may be separated from other substances, its constant resistance to all, even the most potent, reagents, and its tendency to assume a crystalline form; for it is otherwise contained proportionately in very small quantities only in the seeds of the coffee.

I now proceed to the examination of the substances found in the raw seeds, in the order in which they presented themselves in the analysis.

1. *Vegetable fibrine.*—The greater part of the seeds, by weight, consists of an elastic horny substance, in which the other principles are, as it were, incorporated. If the latter be removed by suitable reagents, the insoluble

fibrine remains. To obtain this in a pure state, the seeds were pulverized (by pounding them after they had been kept in a dry temperature, not exceeding 212° Fahr., for several weeks), washed with ether, the finer portion was separated in this way from the coarser, and boiled successively in ether, alcohol, and water as long as a residue remained on evaporation. The fibrine was then boiled with a weak solution of potash and with dilute muriatic acid as long as any particle was dissolved; and the purification was now completed by boiling several times in water.

The fibrine swells under treatment with alkalies and muriatic acid, and may be rubbed down in an agate mortar, with the addition of a little water, to a paste resembling the paste of starch; which, stirred up with water, gives it a mucilaginous character, and separates very slowly from it in the form of white flocculi.

This pasty mass was treated with pure anhydrous alcohol, and heated to the boiling point, when it decreased in volume in proportion to the abstraction of the water by the spirit. The alcohol being removed by the filter, and the fibrine dried, it presents itself as a white-greyish odourless and tasteless powder, insoluble in ether, alcohol, and water, in dilute solutions of alkalies and in dilute acids. Subjected to dry distillation, it leaves a coal which is not very combustible, whilst acetic acid and the other products of the distillation of wood pass over.

Boiled for thirty-six hours with moderately concentrated sulphuric acid, it could not be converted into sugar, but dissolved partially with a dark discoloration, and the solution was precipitated by water.

By roasting it, no particular odour was perceived, excepting that emitted by wood subjected to the same process. When Schrader states, that the horny fibrine freed of all soluble parts, emitted, on roasting, the peculiar smell of roasted coffee, either this is a fallacy, or all the soluble parts were not removed from the fibrine. To determine its ultimate composition, it was subjected to analysis, and gave the following result:

Carbon.....=	47.48
Hydrogen =	6.53
Oxygen ...=	45.99
	100.00

These numbers prove that oxygen and hydrogen are not contained in this substance in the same ratio as in water. If we compare the properties and composition of this substance with those enumerated by Payen in his analysis of the so-called *vegetable incrustations*, there remains no doubt of their identity, and the fibrine may indeed be decomposed into the three substances discovered by Payen. As its composition shows, it consists nearly wholly of one of those three substances, which contains, according to Payen, in round numbers, 48 per cent. of carbon, and 6 per cent. of hydrogen.

2. *Fatty matter.*—If the pulverized seeds be digested in ether (containing water) we obtain a yellow gold-coloured fluid, which on evaporation leaves a yellow buttery substance, with an odour of the raw coffee-seed. Robiquet states that 10 per cent. of resin and fatty matter are extracted by ether, and as regards quantity, the assertion is correct; but there is no resin contained in the seeds. The ether dissolves a mixture of various substances, whose presence may be easily demonstrated in the following manner:

Shake the etherial solution with a fifth of its volume of water, remove this by means of a syphon, and repeat this operation until the water ceases to take up any ingredient from the ether; by this process all the substances soluble in ether will be removed by the water, excepting the fat, which is accompanied by a very small quantity of a substance containing sulphur. This watery solution yields with the salts of lead a yellow precipitate, consisting of several of the acids contained in the seeds, in combination with oxide of lead.

When the watery solution is freed from these acids, it contains only

caffeine, which may be obtained in a pure state in the manner to be described hereafter.

We have just mentioned that the etherial solution of the coffee-seeds shaken with water contains only fatty matter, with a very small quantity of a substance containing sulphur, which cannot be separated from the fat, the presence of which is only to be detected by the discolouration of the silver vessel in which the fat is saponified.

On removing the ether by distillation a yellow substance presents itself resembling butter, which is a mixture of a solid fatty matter with a small quantity of a fluid fatty matter. The former is crystallizable, and may be obtained immediately from the pulverized seeds (although not in a state of purity), by boiling with an equal volume of spirit, and reducing the filtered solution by distillation to one-eighth of its volume. On cooling, the fluid becomes turbid, and deposits the firm fatty matter in the form of flocculi, which melt on the application of heat, and condense to form a brown friable firm mass.

To show the fatty acids contained in the fatty matter of the coffee-seeds, the butyric substance remaining after the ether is removed by distillation, and which should be free of all particles soluble in water, must be boiled with potash until it forms a clear soap (or paste), which should be freed of its salt, and then the solution of the soda-soap in water is to be treated with dilute sulphuric acid. The fatty acids now separate and swim in the form of oil on the surface of the solution, and all impurities should be removed by water. On cooling, this oil concretes as a slightly yellow mass melting at 114.8° or 116.6° Fahr.

To obtain a combination of the two fatty acids with oxide of lead they were saponified with carbonate of soda; the soap was dissolved in spirit, freed of the surplus of carbonates by filtration, and water added to the alcoholic solution of soap. When the greater part of the spirit was driven off by boiling, sugar of lead produced an unctuous precipitate, which was washed with water.

I endeavoured by treating this precipitate with ether to separate the oleate of lead from the combination of the solid acid with the oxide of lead, but the salts of lead swelled up and formed a gelatinous mass not to be filtered, and frustrated my endeavours.

The separation of the mixture was effected by boiling it with spirit, which dissolved both the salts of lead; but on cooling held only the oleate of lead in solution, whilst the second salt formed a white pulverulent sediment. On distilling off a portion of the spirit, the solution deposited more of this salt, which was collected on a filter and washed with cold spirit containing water. By decomposing the oleate of lead dissolved in alcohol with sulphuretted hydrogen, and distilling of the spirit in the water-bath, the oleic acid is obtained, but not free from an admixture of the solid acid.

To the salt of lead, which is not very soluble, a mixture of alcohol and ether was now added, and it was then decomposed by a stream of sulphuretted hydrogen. The fluid from which the sulphuret of lead was removed by filter yielded, when evaporated in a water-bath to displace the alcohol and ether, a white brittle crystalline mass, whose properties corresponded with a hydrate of margaric acid.

To remove every trace of adventitious oleic acid, the acid was recrystallized from alcohol. The first product of crystallization was again recrystallized, and this process was repeated five successive times. On driving off the spirit by a water-bath, the melting point remained constantly 136° Fahr. This acid was subjected to an elementary analysis, and gave,

Carbon...	=75.40
Hydrogen	=12.30
Oxygen...	=12.30
	100.00

To determine the atomic weight of the acid a salt of silver was formed. For this purpose it was saponified with carbonate of soda, the soap was disengaged by adding an excess of solution of soda, pressed between bibulous paper, dissolved in hot spirit, and freed of the insoluble carbonate of soda by filter. An alcoholic solution of this soap was mixed with a large quantity of water, and precipitated by a solution of nitrate of silver. The caseous precipitate was placed on a filter screened from the light, and washed with warm water, and dried at 212° Fahr. In the dried state it is not blackened by the rays of the sun.

0.4725 of the salt left after heating it 0.1380 metallic silver corresponding with 31.37 per cent. oxide of silver, and gave an atomic weight of 3176 for the anhydrous acid.

The numbers found by analysis of the hydrate of the acid and the atomic weight of the (anhydrous) acid combined with silver correspond accurately with the numbers found by Frémy and Stenhouse for palmitinic acid. Both these chemists found the hydrate of this acid composed of C 75.1—75.69 and H 12.4—12.5. The salt of silver contained 31.2—31.45 oxide of silver.

A comparison of these numbers with those found by me, and also of the properties of the hydrate of palmitinic acid and palmitinate of silver with those of the acid found in coffee-seeds and its salt of silver, prove these substances to be identical.

3. *Caffeine.*—The ethereal solution of the coffee-seeds contains caffeine, as we before observed, which may be removed from the ether by shaking the solution with water. By precipitating the acids accompanying the caffeine with basic acetate of lead, and removing the oxide of lead by sulphuretted hydrogen, we obtain a fresh solution of caffeine in water, which contains besides a little acetic acid, no impurities excepting a trace of extractive matter. On evaporating this solution to the consistence of syrup, and allowing it to stand, the caffeine forms white, shining, silky, feathery needles.

As the properties of caffeine are so well marked, and no doubt exists as to its composition, I thought it unnecessary to analyze it.

In the powdered seeds, when exhausted by ether, no caffeine is contained, the ether removes it totally.

4. *Legumine.*—Nature seems to have brought together in the coffee-seeds substances which are otherwise distributed among the most varying genera of the vegetable kingdom. In addition to an *acid*, which in its properties agrees with the acids met with in the bark of the oak and cinchona tribes, and a substance belonging to the alkaloids (caffeine), we find in the seeds the butter of the palms and the sulphurous and nitrogenous substance of the leguminosæ.

To obtain the pure legumine, pour an equal volume of water on the pulverized seeds in a closed glass vessel, and allow the fluid to stand for three or four hours. Pass the brownish fluid through a linen sieve, and then filter through blotting-paper. On adding acetic acid, the legumine will be precipitated. The quantity obtained in this manner is inconsiderable, although the seeds contain a tolerable quantity. I shall hereafter show why water dissolves a small quantity only. To purify the legumine precipitated by acetic acid, allow it to settle, remove the fluid, and wash the deposit, by decantation with water, to which a little spirit has been added, in order to facilitate the precipitation of the legumine. Boil the legumine with alcohol and ether until no residue remains on evaporation. When dried the legumine remains as a slightly yellow or brownish friable mass, which, on being heated, swells up, and emits an odour of burnt horn, and leaves a somewhat combustible coal, containing no appreciable quantity of incombustible constituents. Its composition is in 100 parts,

Carbon...	52.64
Hydrogen	6.97

These are the same numbers which I obtained in an analysis of the legumine of common beans.

A larger quantity of legumine may be obtained by adding a solution of carbonate of potash to the pounded coffee-seeds, but legumine obtained in this manner is impure. The fluid is at first of a beautiful yellow colour, but it subsequently changes to a beautiful green. This alteration of colour is dependent on the presence of an *acid*. On addition of acetic acid the green solution assumes a dirty yellow colour, and the legumine is precipitated in blue flocculi, which are redissolved with a green colour on adding an alkali.

Caseine and legumine are known to form with lime an insoluble combination. The raw seeds of coffee contain a considerable quantity of *lime*, and its presence appears to modify the solubility of the legumine.

The legumine is the cause of the coffee-seeds blackening a silver vessel in which they may be boiled with an alkali. The odour of burnt horn emitted by the seeds when roasting is carried to excess, depends also on the presence of legumine.

Legumine and caffeine are the only nitrogenous constituents of coffee-seeds, consequently the only substances which could be nutritious, but the former is not contained in a hot infusion of the roasted seeds, which is at least not rendered turbid by acetic acid. We may, therefore, conclude, that an infusion of coffee is not nutritious. Liebig has long before this given that opinion, and at the same time drew attention to the interesting relations in the composition of caffeine, alloxane, and taurine.

The presence of legumine in coffee is a further indication of the analogy between tea and coffee. Peligot says, that he discovered caseine in tea leaves, but it is very probable that it was legumine (*i. e.* soluble in acetic acid).

The capability of coffee-seeds of undergoing fermentation depends on the presence of legumine. If hot water be poured on the seeds, when left in a moderate temperature they ferment actively, a froth forms on the surface of the fluid with a development of much carbonic acid, whilst the gelatinous fluid reacts as an acid. On saturating the fermented fluid with chalk, pouring it off the insoluble salts of lime, and freeing it from lime with sulphuric acid, it yielded, on distillation with a small quantity of sulphuric acid, a fluid which smelt faintly of alcohol and strongly of rose-water. The odour neither disappeared on addition of acid nor of alkalies, and appears to depend on an oil of corn spirit as an ether generated in the fermentation.

An aqueous decoction freed from legumine by acetic acid, yields, with a solution of sugar of lead, a yellow precipitate. The fluid filtered off the precipitate gives a grey flocculent precipitate, which soon assumes a greenish colour with basic acetate of lead. The fluid containing the precipitate furnishes an addition of ammonia, a slightly yellow precipitate mixed with a large quantity of six-basic acetate of lead. The substances contained in these precipitates will form the subjects of a second treatise.—*Annalen der Chemie und Pharmacie*, Band i., Heft 2. May, 1844.

ON THE ADVANTAGE OF THE USE OF CARBONATE OF SODA IN THE PREPARATION OF COFFEE.

BY PROFESSOR PLEISCHL.

It is a fact well known in Prague, that the water of the wells in that town is better adapted for use in making coffee than the river water; comparative analyses of the water indicate that this depends on the carbonate of soda contained in the former. Pleischl found this opinion corroborated by the fact that a small quantity of the salt added to coffee improves its flavour, and advises consequently the addition of forty-three grains of the pure carbonate to each pound of roasted coffee, as an improvement to the flavour and also to the therapeutic effect of this beverage, as it neutralizes the acid contained in

the infusion. Pleischl gives an historical sketch of the use of coffee, which may be of interest. It commenced, according to tradition, towards the end of the fifteenth century. The president of a monastery in Arabia was in search of some means for keeping his subordinates awake during their devotions at night, and was advised by his shepherd to give them a decoction of coffee-seeds for this purpose. The shepherd had observed that his sheep, goats, and camels, became particularly lively after eating the fruit of the coffee plant, and did not sleep, according to their usual custom, during the night. The prior found the experiment successful, and hence the use of coffee as a stimulant and agreeable beverage spread over the country.

In the reign of the Sultan Amurath III., the mufti passed a law for closing all the coffee-houses in Constantinople. In the year 1554, during the reign of Solyman, coffee was first admitted to rank among the unforbidden beverages. Prosperus Alpinus, who visited the Levant in 1580 and 1584, gave the first botanical account of the coffee plant, with a drawing of it. Thevenot was the first person who brought it (in 1657) to Paris, where it was introduced into general use by Solyman Aga, the ambassador of Mahommed IV. In the years 1669 and 1672, the first coffee-houses were opened in Paris. The first "*coffee boiler*" established himself in Vienna, in the year 1683, where the same coffee-house yet exists, as described in the inscription on the shield over the door.—*Repertorium für die Pharmacie*, Band xxxiv., Heft 12, page 267.

CHEMICAL EXAMINATION OF RHUBARB ROOT.

BY DR. I. SCHLOSSBERGER AND DR. O. DOEPPING.

(*Continued from page* 138).

B. Analysis of the root for all its proximate principles.

In this field we have again a rich harvest of literary productions, but as we may conclude from what we have already stated, and as any one will readily understand, who has experimented in vegetable analysis, the quantitative results vary according to the method pursued, as the literature up to the present time proves. Thus much we may observe, that the quantity of colouring matter subsequently to be described as *chrysophanic acid*, is always very trifling, whilst the quantity of resins may be given as very considerable. We must refer those who are interested in the quantitative relations, to Berzelius' elementary work, and to Dulk's *Pharmacopœia Borussica*, where he will find them in sufficient numbers. Having paved the way for our own experiments by this historico-critical review, we will commence by a statement of the results of *our analysis* of the *last mode of obtaining* so-called pure *rheine*, fully explained in the fourth edition of Dulk's *Commentary*.

In the beginning, we met with difficulties which spoke unfavourably for the plan pursued. An ammoniacal solution of rhubarb is very difficult to filter, and the fluid which is to be treated with carbonate of barytes, to remove the tannic and gallic acids, is of so intensely dark a colour, that the reaction of a solution of chloride of iron on these acids is not evident, and we are always in doubt whether the quantity of barytes we have added be sufficient. But even an excess of carbonate of barytes, added to a fluid containing tannic and gallic acid, will not remove these acids completely, as experiment will readily prove. If we treat a fluid containing both acids with excess of carbonate of barytes, the liquid is rendered blue, and on the addition of a solution of peroxide of iron, a dark green colour is produced. In following strictly the process of Dulk, we soon observed that we had not

to deal with a pure substance. His plan, moreover, has the fault of great loss. We continually met with substances possessing the qualities so faithfully described by Dulk, and lastly we obtained the rheine of Dulk with nearly all the same properties he has attributed to it. But we could not succeed in obtaining a complete solution in ether and water, and this separation into two portions by the solvent, is against the purity of this substance, add to this, that an ammoniacal solution was partly precipitated by acids, whilst another portion of the substance remained in solution with a red colour ; furthermore, our experiments, as we shall show, prove a peculiar colouring matter and an extractive matter to exist in rhubarb, in addition to various resins, which must all be present in the rheine prepared after Dulk's plan. This is corroborated by the strongly hygroscopic properties of the substance, as also by the circumstance of our not being able to succeed in obtaining the whole mass in the form of prismatic crystals, whilst certainly, after some time, granular masses of the chrysophanic acid, which we shall hereafter describe, separated from it. In the firm conviction that this rheine of Dulk is a mixture of several substances, we did not think it worth while to submit it to an elementary analysis.

After this unsatisfactory result of the process we have described, we designed a new method of analysis based upon many experiments, and which we consider the most judicious at present, as it does not seek after a phantom in the shape of rheine or rhabarberine, as the sole active and chemical principle of the root, but shows us a number of substances in due order, and teaches us to isolate some of them which, in their *peculiar combination*, appear to characterize rhubarb in its chemical and pharmacodynamic properties.

If spirit of 60 or 80 per cent. be added to powdered rhubarb, it acquires an intense brownish-yellow colour, and holds a considerable quantity of the soluble constituents in solution. If the alcoholic extract be after a lengthened digestion strongly expressed, and the residue again digested in spirit, it re-assumes a dark colour. If the operation of expression and extraction be frequently repeated, the residue presents a pale yellow colour, and no longer possesses the peculiar odour and taste of rhubarb, not even when heated, by which means the peculiar odour is generally brought out more distinctly. Extraction by alcohol has the advantage over that by water, or by alkalies, that the pectine, gum, and several salts, the former of which is more especially present in the root in large quantity, are not held in solution, the gelatinous property of the pectine, &c., considerably impeding the pressing and filtering of the extract.

The spirituous extract possesses the peculiar taste of rhubarb in a marked degree, especially after the spirit has been evaporated. The yellowish brown residue obtained by evaporating the alcoholic extract to the consistence of an extract, is in part soluble in water, the other portion which has all the properties of a *mixture of resins* remains insoluble.

I. Examination of that portion of the *alcoholic extract* which is *insoluble* in water : it was evaporated in a water-bath to dryness, dissolved in the least possible quantity of alcohol at 80 per cent., and to this solution ether was added as long as a precipitate was observed.

The latter was of a dark brown colour and flocculent : when separated from the solution by the filter, washed with ether, and pressed between bibulous paper, it had a yellowish brown colour. Spirit of 80 per cent again dissolved a portion (*a*) of it, whilst another portion (*b*) remained undissolved ; the residue (*b*) was slightly soluble in hot spirit, ether, cold and hot water, very soluble in ammonia and potash, with the production of a brown colour, and was precipitated from the solution in the form of brown flocculi by acids. We endeavoured to purify it by dissolving it in potash, precipitating with sulphuric acid, and washing with water, until barytes no longer

showed traces of sulphuric acid. Its composition, which corresponds with that of a resin of rhubarb, which we shall shortly mention, and its resemblance to those partly mould- or *humus*-like (moderartigen) substances included under the denomination of *apothema*, induced us to name it the *Aporetine* of the rhubarb (product or deposit of the resin of rhubarb). It may be recognised by the properties we have mentioned. In the dried state it has a black shining colour, is friable, and is decomposed on being heated on a platina spoon without melting. Want of quantity prevented us from examining its compounds, and we can therefore, only give its per centage composition :

Carbon	58.89
Hydrogen	4.35
Oxygen	36.76
	100.00

The total insolubility of aporetine in spirit after it is once separated, is very remarkable, for it was held in solution in spirit before it was precipitated by ether. The portion (*a*) of the precipitate produced by ether, which was separated from the aporetine by alcohol, presents itself when dried and rubbed down, as a yellowish brown powder, with the following properties : it is but very slightly soluble in water and ether, very soluble in spirit and in alkalies, may be thrown down as a yellow precipitate by the mineral acids from the latter solution, and is dissolved by acetic acid, producing a yellow colour. Its combinations with alkalies are of an intensely red brown colour ; heated in a platina spoon, it melts, disengages yellow fumes, and diffuses a faint odour of rhubarb, and leaves scarcely any trace of ashes. The yellow fumes appear to indicate the presence of a peculiar acid which we shall describe hereafter, but all endeavours to separate this acid from it proved fruitless. In flavour it bears no resemblance to rhubarb. It was soluble in concentrated sulphuric acid, and was again precipitated in the form of yellow flocculi on adding water. Its yellow colour when freshly precipitated and in a moist state, was the cause of its being confounded by many of the experimenters above named, with chrysophanic acid more especially, as it has the property in common with the latter of assuming a red colour on the addition of alkalies; the colour however of the former has a distinct brown shade. On account of this relation to the alkalies, we have named it the brown resin of rhubarb or *Phæoretine* (from φαιος *red-brown*, and ῥητινη *resin*).

	Analysis made with oxide of copper. I.	*Analyses made with chromate of lead.* II.	III.
Carbon	58.40	59.86	59.73
Hydrogen	4.97	5.15	5.15
Oxygen	36.63	34.99	35.12
	100.00	100.00	100.00

To determine the atomic weight of phæoretine and its absolute atomic number, we endeavoured to procure a combination with lead, by means of an ammoniacal combination of the resin with acetate of lead. The purple (violet red) precipitate appeared to change continually on washing it with water and spirit, but we made an analysis of a salt of lead with sulphuric acid; according to which, the atomic weight of the resin would be =766.68.

	ANALYSIS I.	ANALYSIS II.
Carbon	20.22	20.57
Hydrogen	1.66	1.54
Oxygen	13.59	13.36
Oxide of Lead	64.53	64.53
	100.00	100.00

If we endeavour, from these results, and from the atomic weight of the combination with lead, to construct a formula for the resin and for the combination, we cannot find a simple expression which corresponds at the same time with the atomic weight and the per centage composition, so that we must regard the combination of phæoretine with lead, not as stochiometrically combined, and must be content with a *relative* number of atoms approaching nearly to the above per centage composition, which would be :

C_{16} H_8 O_7 atomic weight = 2013.42.

Whence we should have a per centage composition of :

Carbon	60.27
Hydrogen	4.95
Oxygen	34.46
	100.00

If an *ethereal* solution of the resin from which the aporetine and phæoretine have been separated, be freed of its ether by distillation, and the residue dried, pulverized, and dissolved in the least possible quantity of spirit, and again treated with ether, as long as a *precipitation* takes place, a quantity of resin will be still separated, which is insoluble in ether, but soluble in alcohol, and which in composition and properties does not differ in any material point from phæoretine.

The ethereal solution freed in this manner from the admixed phæoretine, and rendered yet purer by filtration, left, when the ether was distilled off, a resinous residue, which was evaporated, rubbed down, and again treated with ether as long as a portion was dissolved. A dark brown granular residue now remained, and the ether was of an intensely red colour. The granular residue mixed with a small quantity of alcohol deposited the yellow substance we have frequently mentioned, and of which we shall have occasion to speak again whilst the solution consisted chiefly of phæoretine. The bright substance was purified from the resin with which it was mixed by re-crystallization.

The ether was again partially removed from the intensely reddish yellow ethereal solution by distillation, and the residue was placed in a porcelain cup, which could be accurately closed, and left to rest. During the evaporation of the ether, beautiful yellow crystalline granules adhered to the walls of the vessel, and in a few days nearly the whole mass in the cup had formed a mass of crystals. By adding a little ether, the crystals could be removed from the mother liquor by the filter ; they were, therefore, frequently washed with ether, in which they were but slightly soluble in their isolated state, when free from resin. A few crystals again separated from the filtered ethereal solution on standing.

When the *ethereal fluid*, after being set aside for several days, no longer showed a disposition to crystallize, it was evaporated to dryness. The substance thus obtained, again exhibited all the properties of a resin, if solubility in spirit, in part in ether, in alkalies, fusibility by heat, and softening in warm water, may be regarded as characteristics of the groups of resins. This resin, which is soluble in ether, forms beautiful purple combinations with potash and ammonia, which are very soluble in water, and on that account named by us *Erythroretine*, or the red resin of rhubarb. Pulverized, it presents itself as a yellow powder, resembling rhubarb in colour, and there is no doubt that the root derives its colour chiefly from this constituent, and from the chrysophanic acid which we shall afterwards describe.

Erythroretine is, when dried, but slightly soluble in ether and acetic acid, insoluble in muriatic acid and dilute sulphuric acid ; it is very soluble in spirit, and is precipitated from its alkaline combinations by the acids in the form of yellow flocculi, which soon adhere in mass. It is soluble in concen-

trated sulphuric acid without heat, imparting to the solution a dark brown colour, and is again precipitated in yellow flocculi on diluting it with water. But a very small proportion is soluble in water like phæoretine, and the solution is of a slightly yellow colour. This slight solubility in water appears to us to be caused by an admixture which exerts an essential influence on the solubility of many substances, as daily experience teaches us. Heated on a platina spoon, it emits yellow fumes (perhaps a retention of chrysophanic acid hereafter to be described ?) and forms a coal which is not very combustible, but leaves very little ashes. Its taste is inconsiderable. Dissolved in ammonia, it enters into a combination with acetate of lead, which is of a violet colour, and insoluble in water. The precipitate obtained by washing was visibly changed by the action of the carbonic acid of the air, its surface becoming covered by a white layer of carbonate of lead, which was again formed, if removed ; there was, therefore, but slight hope of a successful result in determining the atomic number as experience also corroborated. We, however, state the results we obtained :

	ANALYSIS I.	ANALYSIS II.	*Atomic Formula.*
Carbon	16.84	16.81	C_9
Hydrogen	1.37	1.34	H_{11}
Oxygen	12.52	12.52	O_5
Oxide of Lead	69.27	69.27	2 (Pb O)
	100.00	100.00	

The atomic weight of the combination with lead is, therefore, 4021.53. Hence the per centage composition, obtained by calculation, is as follows :

Carbon	16.97
Hydrogen	1.24
Oxygen	12.43
Oxide of Lead	69.35
	100.00

1. 0.3845 of the substance dried at 212° Fahr., gave { 882 Carbonic Acid / 187 Water
2. 0.350 of the substance dried at 212° Fahr., gave { 801 Carbonic Acid / 181 Water

	I.	II.
Carbon	63.08	62.94
Hydrogen	5.46	5.72
Oxygen	31.46	31.34
	100.00	100.00

These relations correspond as accurately as experiments of this nature will permit with what we had found, but we could not succeed on abstraction of the oxide of lead from the weight of the erythroretine, in obtaining a simple relation according to the analyses we have given of the resin when free from the oxide of lead, and we are necessitated to look upon this combination as inconstant, and must be contented with the following formula of the relative number of atoms in erythrorctine :

$C_{19}\ H_9\ O_7$. Atomic weight=2253.45.

The per centage composition by calculation will, therefore, be,

Carbon	63.96
Hydrogen	4.98
Oxygen	31.06
	100.00

(To be continued.)

ON THE SUBSTITUTION IN COMMERCE OF STARCH-SUGAR (GLUCOSE) FOR HONEY.

BY M. LASSAIGNE.

In the wholesale grocery trade we had some time since an opportunity of satisfying ourselves that a delivery of thirty-five kilogrammes of starch-sugar solidified into a granulated mass, had been made as British honey of an inferior quality. This gross substitution having been discovered in time, was put a stop to by communicating the circumstance to the contractor, who had received this article under the false name of *common honey**.

This species of adulteration to which we now call the attention of pharmaciens and traders, well deserves being taken into consideration, for it should be considered not as a mere mistake, but a shameless act to be condemned by every honest man. In 1842, one of our colleagues in the Pharmaceutical Society of Paris, M. Menier, showed that this same starch-sugar was employed for the preparation of a spurious manna, having some physical resemblance to the fragments of genuine manna in tears.

The case we are now publishing shows, that the drug trade is likely to be infected by a number of articles, which frequently bear no relation whatever to the substances for which they are made to pass, except in the name which the avarice of individuals has audaciously imposed on them.

The article which forms the subject of this notice, was contained in a small cask, about the size of those in which the honey of Britain is every day exported, with the exception of its being paler, it had the consistence of common honey solidified, as also its granular and crystalline appearance. The odour of it was not that of honey, but that of *syrup too much boiled, and a little caramalized*; its taste, at first, slightly saccharine, became ultimately a little sour and bitter. To these physical characters, very different from those of common honey of inferior quality, there was joined one that was more particularly remarkable; viz., the tendency of this article to become more and more concrete, and to harden on being exposed to dry air, at a temperature of 51° Fahr., whilst pure honey retains its consistence as every one knows, and becomes even more fluid, according as the temperature is raised.

Diluted in from two to three times its volume of cold water, it yielded a granular substance, which, when pressed between several folds of blotting-paper, in order to free it from the coloured liquid, assumed the appearance of a whitish mass, consisting of small crystalline grains. These crystals, being well-dried, were very like the starch-sugar found at present in commerce, by reason of their fresh and slightly saccharine taste, and in corroboration of our assertion is this, viz., that the solution of these crystals in distilled water evidently contained sulphate of lime, as was shown by nitrate of baryta and oxalate of ammonia. These crystals, when compared with the crystallizable part of *pure honey*, presented an obvious physical difference.

The same quantity of these crystals, and of the crystallizable sugar of honey, was dissolved in the smallest quantity of water possible, and a drop of one of these two solutions was placed on one and the same glass plate. On exposure to the dry air, at a temperature of 68° Fahr., the sugar of honey soon began to crystallize in small white grains, formed of needles shooting out from the same central point, whilst the sugar of starch assumed the appearance of a viscid granular mass in the same space of time.

The viscid, brownish, yellow liquid in which the crystals were observed, which we separated by the cold paper, had an acrid and saccharine taste;

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* Four years ago, while visiting the grocery establishments, we ascertained that a cask of starch-sugar had been given to a grocer for good honey.—A. Ch.

on being examined with nitrate of baryta and oxalate of ammonia, it was immediately rendered turbid by the use of these two reagents, and formed copious white precipitates. The presence of a greater quantity of sulphate of lime in this saccharine coloured liquor (a salt not formed, or scarcely found, in the different species of honey), proves that it is a product of art, and not of bees, as is clearly proved by the physical characters above assigned to this product, manufactured at the present day, in a very large quantity for different uses.—*Journal de Chemie Médicale.*

A FEW REMARKS ON THE FLOWERS OF THE ARNICA MONTANA, *LIN.*

BY H. VERSMANN.

The reaction of pure carbonate of magnesia on an infusion of arnica flowers, and the assertion by Dr. Thomson, that strychnine may be detected in the flowers of the *arnica*, induced Professor Pfaff * to engage me in a few experiments on this therapeutic agent. The result of my examination I beg leave to communicate.

The aqueous infusion of flowers of arnica reacts as an acid ; is of a yellow-brown colour ; and has at first a bitter, subsequently a strong acrid flavour, which is persistent in the throat. Tincture of galls and a solution of tartrate of potash produce no change in the solution ; but acetate of lead and protonitrate of mercury a copious whitish-yellow precipitate. Solution of gelatine renders an infusion of arnica very turbid, and with chloride of iron it yields a black precipitate; and when largely diluted, a green colour. On addition of pure or carbonated magnesia, *an intensely green* colour is produced after the lapse of a few hours. As the gelatine and the chloride of iron had demonstrated the presence of tannin, and, indeed, of that description which produces a green colour with the salts of iron, it became desirable to ascertain whether the tannin was the cause of the green colour which the arnica infusion assumed on the addition of magnesia. To ascertain this, a solution of catechu, which contains such an abundance of this peculiar tannin, which gives a green colour to iron, and a solution of pure tannin in distilled water, were decomposed both by pure and carbonated magnesia, but no change of colour took place in either solution, even after the lapse of several days.

The property of gallic acid, where alkalies are present, to change colour, to enter into different combinations, and, lastly, to become converted into ulmic acid, under an absorption of oxygen and evolution of carbonic acid, led to the presumption, that the change of colour produced in an aqueous solution of arnica flowers on addition of magnesia, depended on the presence of gallic acid. An aqueous solution of gallic acid, on addition of pure or carbonated magnesia, assumes, first, a yellow colour, then becomes yellowish-green, and, lastly, on standing for several hours, brownish-green. The same

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* Dr. Pfaff, of Kiel, observes in a letter to me: "Arnica flowers is one of those agents whose chemical composition and therapeutic powers, which depend on the former, are enveloped in obscurity. Two recent notices on this drug have again drawn my attention to this subject : the one treats of a remarkable green production of a colour taking place on addition of magnesia to an infusion of arnica (this notice is to be met with in the *Berlin Medical Journal*); the other is an article in a Danish monthly medical periodical in which it is stated that Thomson has detected an igasurate of strychnine in the flowers of arnica, which in some measure explains its *modus operandi.* This has induced me to engage Mr. Versmann in an analysis of the flowers to enquire into the cause of the former phenomenon and to test the correctness of the latter suspicious assertion. The result of this enquiry forms the subject of this paper."—*Editor of Repertor. of Pharm.*

appearances are produced if, instead of pure gallic acid, a mixture of gallic acid and tannin be used. If we attempt to precipitate the tannin from a solution of arnica flowers, by means of gelatine, we shall never succeed so far as to separate the tannin from the gallic acid, for either the gelatine will be deficient in quantity, or a portion of the tannin will be dissolved by the unavoidable excess of gelatine, rendering a perfect separation of the tannin from the gallic acid impracticable. It is certainly a safer plan to precipitate the tannin by means of animal membrane which I made use of: but even after standing for some time, chloride of iron yet produced a black precipitate with the solution. The presence of gallic acid in flowers of arnica, as previously demonstrated by Pfaff, is thus confirmed; and we may regard this acid as the cause of the peculiar green discoloration taking place on addition of pure or carbonated magnesia to a solution of arnica. That a liquid, whence the tannin has been removed by animal membrane, when diluted, assumes a green colour on adding chloride of iron, is no decisive proof of the absence of gallic acid. The yellow colour of the fluid is sufficient to change the bluish-black turbidity to green, as several experiments proved, and we, moreover, frequently obtain very different results with the same reagents, where the circumstances are rather different. If a few drops of a solution of gallic acid be added to a very dilute solution of chloride of iron, a green turbidity is the result; but if, on the other hand, a few drops of a solution of chloride of iron be added to a diluted solution of gallic acid, the turbidity thence arising will be of a dark blue colour. As regards Dr. Thomson's observation, that the flowers of arnica contain strychnine—the flavour of the aqueous solution is, in this case, no criterion, for the tannin might precipitate the strychnine, and then the intensely bitter taste which strychnine preserves, even when diluted to one-millionth times its weight, would be lost. To determine, therefore, the probable quantity of strychnine contained in the flowers of arnica, one pound of the fresh flowers were powdered, and mixed with one ounce of slacked lime, and exhausted by percolation with spirit. By distillation the greater portion of the spirit was now driven off, and the residue being mixed with a small quantity of acetic acid, was deprived of the remaining spirit by boiling. This residue now consisted of a yellow-brown fluid and a yellow green soft resin, very soluble in ether. The fluid was separated by filtration from the resin, and gave no evidence of that intense bitter taste characterizing the most minute quantity of strychnine; and as ammonia produced no precipitate, the absence of the alkaloid was decidedly proved.

In conclusion I must observe, that the activity of the flowers of arnica does not appear to depend on the presence of an alkaloid, but rather on the resin, which is characterized by an extraordinary acrid flavour, the pungency remaining for a long time on the palate.—*Repertorium der Pharmacie*, Band xxxv., Heft 1.

ON THE PRESENCE OF LIME IN VERATRINE.

BY H. VERSMANN.

Frequent analysis of specimens of veratrine have proved to me that this drug frequently contains not an inconsiderable quantity of lime, and I therefore advise all Pharmaceutists to test, by means of a platina spoon, whether the alkaloid can be perfectly dissipated. As lime is frequently employed in the manufacture of veratrine, it is frequently found mixed with the preparation; it not only improves the appearance of the alkaloid, but even prevents it from becoming resinous in the process of drying, and is consequently frequently left purposely in the specimen. By dissolving veratrine in alcohol, adding a small quantity of sulphuric acid, filtering off the sulphate of lime, and precipitating with ammonia, the veratrine may be easily purified after removing the alcohol.—*Repertorium für die Pharmacie*, Band xxxv. Heft 1.

DECOMPOSITION OF CALOMEL BY ALMOND SYRUP.

BY T. KALLHOFERT.

I BEG leave to communicate a case which happened to me lately, and must have occurred to many Pharmaceutists and Medical men, who by no means are anxious of having the calomel they may order converted into cyanide of mercury by means of almond syrup. A quarter of a year ago a prescription was laid before me, ordering one grain of calomel to be added to ℥vj of almond syrup and ℥j of infusion of the linden flowers. I had scarcely dispensed the draught when the medical man who had ordered it, brought it me back again; saying, I must have made some error in the preparation of it as it was of a grey colour instead of being white, and presented a black sediment instead of a white sediment, calomel. Moreover, the whole preparation must have undergone some decomposition, for in the space of a quarter of an hour it had become clear above, whilst a grey flocculent cheesy sediment had been deposited at the bottom of the bottle. The medical man, in writing his prescription, had forgotten that the almond syrup is made of bitter almonds; consequently, that the prussic acid present would produce cyanide of mercury, and that the muriatic acid which would be disengaged, would decompose the draught.—*Repertorium für die Pharmacie*, Band XXXV., Heft 1.

REVIEWS.

A MANUAL OF ELEMENTARY CHEMISTRY; *Theoretical and Practical.* By GEORGE FOWNES, Ph.D., *Chemical Lecturer in the Middlesex Hospital Medical School, and to the Pharmaceutical Society of Great Britain. With numerous Wood Engravings.* Small 8vo, pp. 553. *London: John Churchill, Princes Street, Soho.*

WE are frequently applied to by correspondents to recommend a good work on Chemistry, for students who are not far advanced in the science. We have also had repeated enquiries, whether the lectures, delivered at Bloomsbury Square, are likely to be published for the benefit of Associates in the country. The volume before us furnishes us with a very satisfactory answer to both these questions. It is the most concise and perspicuous work of the kind which we have seen, and may be considered the "Text-book" of the lectures of the author at the establishment of the PHARMACEUTICAL SOCIETY. It does not supersede the more voluminous and extended works of Brande, Graham, and Kane, but is admirably calculated to prepare the student for those more elaborate treatises which, without some preliminary study, might possibly discourage him by their magnitude and comparative intricacy.

As a lecturer, Mr. Fownes is remarkable for the clearness with which he explains every subject which comes before him; his strict adherence to matter of fact, and avoidance of all notions of a speculative or theoretical nature. His *Manual of Elementary Chemistry* possesses precisely the same merit, and is equally well adapted for the capacity and improvement of the class of students for which it is especially designed. The following is the arrangement of the subject:

Part I. *Physics.*—Of the Physical Constitution of the Atmosphere and of Gases in general: Heat, Light, Magnetism, Electricity.

Part II. *Chemistry of the non-metallic Elements.*—Compounds formed by the Union of the non-metallic Elements among themselves. On the general Principles of Chemical Philosophy.

Part III. *Chemistry of the Metals.*

Part IV. *Organic Chemistry.*—The ultimate Analysis of Organic Bodies. Empirical and rational Formulæ. Determination of the Density of the vapours of volatile Liquids. Saccharine and amylaceous Substances, and the Products of their Alteration. Substances more or less allied to Alcohol. Vegetable Acids. Azotized Organic Principles of simple Constitution. The Vegeto-Alkalis and Allied Bodies. Organic colouring Principles. Oils and Fats. Components of the Animal Body. Products of the destructive Distillation and slow putrefactive Change of Organic Matter.

The Appendix contains an explanation of the equivalent numbers, several very useful tables, and the analysis of the mineral waters of Germany.

The wood-cuts, which are well executed from the objects themselves, represent all the chemical apparatus described in the work; and the forms of the various crystals.

A Dictionary of Terms used in Medicine, and the Collateral Sciences. By R. D. Hoblyn, A.M, Oxon. *Second Edition, revised and enlarged.* Pp. 394. Small 8vo. *Sherwood, Gilbert, & Piper.*

This work is similar in design to Hooper's *Dictionary;* but it is less voluminous, the subjects being treated more briefly. Its recommendation over the last-named work consists in its more portable form and lower price. As a book of reference for the signification of the terms used in medicine and the collateral sciences, it will be found sufficiently explicit; and this is, perhaps, the extent to which information would be sought in a work of this kind.

BOOKS RECEIVED FOR REVIEW.

Experimental Researches in Electricity. By Michael Faraday, D.C.L., F.R.S., &c. &c. *Reprinted from the "Philosophical Transactions of* 1838—1843;" *with other Electrical Papers from the "Quarterly Journal of Science, and Philosophical Magazine."* Vol. II. 8vo. pp. 30. *London: R. & J. E. Taylor, Red Lion Court, Fleet Street.*

Familiar Letters on Chemistry. *Second Series. The Philosophical Principles and general Laws of the Science.* By Justus Liebig, M.D., Ph.D., F.R.S., &c. &c. Edited by John Gardner, M.D. Small 8vo. pp. 218. *London: Taylor & Walton.*

ERRATA.

Our readers are requested to correct the following Erratum in our last number, page 154, last line, *for* LUKE, *read* MARK.

PATENT MEDICINE LICENCE.—We inadvertently misled a Correspondent in our last number, by stating that the limits of the twopenny post extended to three miles from the General Post Office. This was formerly the case, but afterwards the twopenny and threepenny posts were merged into one, extending about ten miles. This it appears was the limit alluded to in the Medicine Stamp Act; but we have subsequently been informed at the Stamp Office, that when the penny postage was established the limit was extended to twelve miles or more. A map may be seen in the office at Somerset House, in which the line is marked.

TO CORRESPONDENTS.

NOTE BY MR. RICHARD PHILLIPS, JUN.—In the last number of this journal I offered some remarks on the tests for separation of lime and magnesia, and I mentioned that of separating the lime by means of carbonate of potash, hydrochlorate of ammonia being present. Now, an accidental source of error may arise in this process, namely, that the carbonate of potash, as usually sold, often, and I may say nearly always, contains alumina, which, in the process I have referred to, would be precipitated by the hydrochlorate of ammonia, and would be mistaken for lime. It is, therefore, better to employ carbonate of soda or carbonate of potash, formed by heating to redness the bicarbonate, both of which are free from the above impurity.

Craig's Court, Oct. 22, 1844.

E. J. (Doncaster).—The liquor remaining in the retort after the distillation of *spiritus etheris nitrici*, differs according to the way in which the process has been conducted. Aldehyd, and acetic, malic, and oxalic acids, are sometimes produced.

"FILIUS ESCULAPII."—(1.) The electrotype process is explained by the theory of *electrolysis*; it depends on the decomposition of a metallic salt in solution, by an electrical current. For an explanation of the theory see any modern work on systematic Chemistry.—(2.) The translation referred to would not be worth the space it would occupy.

X. Y. Z.—(1.) See vol. iv., p. 48 of this journal.—(2.) See ditto, p. 46.—(3.) As much essence of camphor should be used as can be added without rendering the water turbid.—(4.) Bicarbonate of soda is injured by much exposure to the air.

G. C. B.—(1.) *Tinned* iron or lead pipes would answer very well.—(2.) Iron or slate.—(3.) Earthenware.—(4.) A £2 licence is required.—(5.) Our Correspondent must judge for himself.

"POTASH."—(1.) We have had no experience in dyeing ivory.—(2.) We know of no English work which treats on plaster spreading.—(3.) Non-conducting substances are usually brushed over with plumbago, to prepare them for the electrotype process.

J. S. S. (Berkhamstead).—(1.) Ammonia is said to be without action on cantharadin.—(2.) Pereira says, "Alcohol, ether, and oil of turpentine, are the best solvents of euphorbium."

"Amator Scientiæ."—(1.) Hydrated oxide of lead.—(2.) Certainly.—(3.) Refer to some work on Chemistry; an explanation would occupy too much space here.—(4.) If the water be pure, the solution will be clear.—(5.) Rectified spirit of wine is alcohol, with about fifteen per cent. of water. Alcohol may be considered a hydrate of ether.—(6.) The process is similar to that for caustic potash.—(7.) Hydrocyanic acid causes no precipitate in solution of sulphate of iron, because sulphuric acid has a stronger affinity for bases than hydrocyanic.—(8.) Cyanide of potassium does cause a precipitate when added to solution of sulphate of iron; because, in this case, there is a double decomposition, and an insoluble product formed.—(9.) Most of the oil of rosemary of commerce is imported from abroad; it is said to be adulterated with oil of turpentine.

J. P. S.—(1.) We think the words must have been incorrectly copied from the prescription.—(2.) Cinnabar of antimony is another name for vermilion, it having been originally obtained as a residuary product in the preparation of butter of antimony, from corrosive sublimate and sulphuret of antimony.

J. K. V.—Liebig's *Agricultural Chemistry*.

G. D. should consult a medical man.

"An Apprentice."—Mr. Fownes's *Manual of Elementary Chemistry*. See page 240.

X. X.—(1.) We gave a formula for ink, in vol. ii., page 553. We are not acquainted with any which is better adapted for steel pens; but should be glad to receive information from any Correspondent on this subject.—(2.) For the Art of Bronzing, we must refer X. X. to Dr. Ure's *Dictionary of the Arts*, page 190 to 194.

A. P. S. (Juvenis).—Lavender Water—Dissolve three or four drachms of English oil of lavender in a pint of spirits of wine, adding half an ounce of essence of ambergris and musk, with a little otto of roses, essence of bergamot, &c. to the taste. Eau de Cologne—Spirits of wine, one pint; oil of neroli, twenty drops; cedrat, half a drachm; rosemary, fifteen drops; bergamot and lemon, of each one drachm; origanum, six drops; citrin, one drachm; eau de meliss des Carmes, two ounces. The proportions may be varied to suit the taste.

"Scrutator."—We have forwarded the letter to the party concerned.

Θ.—Carbonate of ammonia may be made into pills with crumb of bread.

"An Apprentice" (York).—(1.) See vol. iii. pp. 24, 143, 192, 341.—(2.) *Selecta è Prescriptis*—(3.) To detect flour in honey, dissolve it in boiling water, and, when cold, add a few drops of tincture of iodine, which will give a blue colour if starch be present.

A Member" inquires how Vinum sem Colchici is made by the wholesale druggists? Probably like the tincture, with the substitution of wine for spirit.

"Alpha," A. P. S.—The Spring. Apply at 17, Bloomsbury Square, giving name and address.

"A Wellwisher" wants a recipe for Essence of Spruce?

A. P. S. (Oct. 19).—We have never seen a formula for cold cream without rose-water, nor have we ever seen cold cream *mouldy*.

"Amicus" is referred to *The Forceps*, a work professing to treat of all matters relating to the teeth. We are not acquainted with a good *succedaneum*.

"Amator Fidelitatis."—We are fully impressed with the great importance of the subject, and have never lost sight of it since the establishment of the Pharmaceutical Society, which cannot fail to remedy the evils complained of, by raising the qualifications of the members of our body, and thus entitling us to the protection of the Government.

J. E.—Acetum Scillæ P. L, occasionally throws down a slight deposit, in other respects it does not change materially by keeping.

A. B. C.—A Chemist is bound to prepare faithfully the prescription of a Physician. If he should observe a mistake in the prescription, it is his duty to wait on the prescriber, if possible. If the mistake be one which would *endanger life*, and the prescriber cannot be found, the Chemist must use his own discretion so as to prevent danger. No capricious deviation from a prescriptiou is justifiable.

"Censor."—Precipitated chalk, when properly prepared, is a more pure article than creta preparata, and we presume that it may be used with propriety in misturæ cretæ.—(2.) *Gray's Supplement* is out of print.—(3.) A new edition of it is likely soon to appear, revised and improved by Mr. Redwood.

"Warwick."—(1.) We have never seen the work.—(2.) We have no wish to see it, or to know who is the publisher.—(3.) Yes.

E. A.—(1.) *Druggists's Price Book*, by W. Forbes, sold by Baiss, Brothers, and Co., 126, Lower Thames Street.—(2.) For Chilblains, spirits of turpentine is a good application, or a solution of sal ammoniac in vinegar. For broken chilblains ung. hyd. nit. oxyd.

A. P. S. and X. Y. Z.—Honey Water: ℞ Ol. Santali. flav. m. xx.; Tinct. Moschi ℥iiss.; Ess. Bergam. ℥iiss.; Ol. Caryoph. ℥v.; Ol. Lavand. Ang. ℥v.; Aquæ Rosæ Oij.; Aqua fl. Aurant Oij.; Sp. Vini R. Cong. Mix and filter.

"Amicus Inquiscus."—(1.) See the leading article of this number.—(2.) The young man is not compelled to join the Society.—(3.) If he join it, he must pass an examination.—(4.) Defaulters may be readmitted on payment of arrears and a small fine.

"A Member" (Stockton) has not pointed out the means by which he detected the impurity which he complains of, consequently his statement is not sufficiently substantiated for publication.

N. H. is desirous for the Chemists to follow the example of the Drapers, in combining to close their shops at an earlier hour in the evening, in order to allow the young men more time for study.

"Juvenis." W. A.—Next month.

Pilula Hyd. Chloridi Co.—Several Correspondents have alluded to the use of castor oil as a vehicle for this pill. We have tried it, and find that it answers remarkably well.

Tincture of Buchu.—Buchu leaves, ℥ij; proof spirit, ℥xvj. Macerate seven days (P. E. 1839).

Mr. Baker.—We have forwarded the first half of the letter; cannot reply to the remainder, not knowing Mr. Baker's address.

"Egomet."—See vol. ii., page 481.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. VI.—DECEMBER 1st, 1844.

COUNTER PRACTICE.

When compiling the Sketch of the Progress of Pharmacy in Great Britain, which was intended as an Historical Introduction to this journal, we endeavoured to ascertain at what period the Chemists began to give advice across the counter, and for this purpose consulted a variety of old works, pamphlets, and documents in the British Museum and other libraries. But on this subject, and even respecting the date at which the body originated, the evidence is not very conclusive and satisfactory. We were enabled to trace the Chemists and Druggists to about the period of the Dispensaries of 1696, which were established by the Physicians as a means of obtaining medicines on reasonable terms, and thus restraining the encroachments of the Apothecaries on medical practice*. At this time, and in fact as late as the year 1790, it was contended by some persons, that even the Apothecaries had no right or qualification to prescribe. It was said,

"The compounding of medicines prescribed, and knowing why they are prescribed, are two different things: one is an ordinary habitual thing, the other depends upon the circumstances of the case, and cannot possibly be judged of unless by one who understands the natural history of the human body, and is acquainted with the mechanism and operations of nature. These are heights of knowledge at which few Apothecaries arrive."

On the other hand, the Apothecaries disputed the right of the Chemists to practise Pharmacy; and in 1794 they formed an Association for the purpose of putting a stop to "the encroachment which the Chemists and Druggists had of late years made upon the profession of the Apothecary, by vending pharmaceutic preparations, and compounding the prescriptions of Physicians."

* *Historical Sketch*, pp. 14—18.

Another object of this Association was "to restrain ignorant and unqualified persons from practising (medicine) at all."

It is stated in the report of the Committee, that this innovation of the Druggists is "a national evil of no small magnitude;" that from ignorance and fraudulent motives they make mistakes and supply drugs which are "mere offals;" and that they "add pretended medical advice to erroneous medical compositions." This is the first distinct and direct evidence which we have been able to find of the existence of *counter practice* among the Druggists. But it is probable that the practice had been gradually gaining ground for some time previously, since it is mentioned at the above period as a common occurrence.

When the Apothecaries united for the purpose of putting a stop to this innovation, their chief complaint had reference to the compounding of prescriptions by Chemists, while the *counter practice* was adverted to as an abuse so palpable as scarcely to merit an argument. But by this time the Chemists had become too important and powerful a body as dispensers of medicine to be so easily driven from the field, and whatever might have been the effect of an attack, if it had been confined to the medical question, the result of the sweeping measures which were attempted, was a failure, and the Chemists not only maintained their ground as dispensers of medicine, but continued to give advice across the counter without restraint.

This practice has given rise to much dissatisfaction, and the grounds upon which it is objected to by medical men may be clearly understood by the following illustration:—

A blacksmith is sent for to repair a steam-engine, with the construction of which he is unacquainted. In his endeavours to put it in order he seriously injures it, and the maker, who comes to his assistance, has more trouble in rectifying the blunders than he would have had in making a new engine. The blacksmith might have been quite competent to grease the wheels, clean the bolts, or make the screws; but he does not understand the construction and functions of a complicated machine.

The human frame is a machine more complicated than a steam-engine, and any person who undertakes to repair a derangement of its functions, ought to be fully sensible of the responsibility which rests upon him, and should do nothing unless he possess sufficient knowledge to guard against danger. The Chemist and Druggist may be quite competent to administer an aperient draught, but he would not be justified in undertaking to manage a case of enteritis. He may be competent to prepare a rhubarb mixture, and calculate the dose with which he may relieve a patient whose bowels are slightly relaxed; but if he attempt to cure dysentery, cholera, or nephritis, he may do more harm than good. To revert to the illustration, he may safely "grease the wheels of the machine," but has no business to undertake any *substantial repairs* when it is out of order.

Those who advocate a theoretical and utopian system of perfection, assert, that no Chemist ought under any circumstances to prescribe or give advice in the most trifling cases, and that the administration of medicine should be exclusively in the hands of medical practitioners; that all the individuals in each department of the profession ought to be *fully qualified*, and that the public should adhere strictly to the line of demarcation created by this division of labour. This would be the *ne plus ultra* of medical legislation. But how does it accord with the facts of the case, the condition of the profession itself, and the prejudices of the public? We have no wish to make any remark at all discourteous to the profession, but it cannot be denied than even doctors sometimes disagree, and differ very materially not only as to the nature of the complaint, but also as to the mode of treatment, a fact which proves that the art and science of medicine is not based upon fixed and unerring principles, but is in some instances involved in no little obscurity. The public know very well that this is the case, and are aware that valuable remedies have not unfrequently been discovered by quacks and other persons not in the profession. It is therefore difficult to control the prejudices of patients; and not only the Chemists, but Hydropathists,

Homœopaths, and Quacks and Impostors of every description enjoy a certain proportion of the confidence of the public, in spite of all that may be said with much propriety in favour of qualified practitioners.

Moreover, the members of the profession do not all adhere to the division of labour prescribed, but some of them even put an end to the distinction between themselves and the Druggists by becoming shopkeepers.

In the same street may be seen two shops, fitted up exactly alike. The windows of each are adorned with coloured show-bottles, cut smelling-bottles, medicine-chests, tooth-brushes, and perchance a few proprietary medicines. One of these shops belongs to a member of the College of Surgeons, and a licentiate of the Apothecaries' Company (M.R.C.S., and L.A.C.); the other is the establishment of a Chemist and Druggist who is probably a member of no society (M.N.S.), and who is not obliged by *law* to know the difference between jalap and rhubarb, much less to distinguish fungus hæmatodes from a cancer, or peripneumonia from pleurisy. Both these establishments are in the eyes of the public "doctors' shops." The proprietor of each is presumed to know the nature and uses of the articles in which he deals, and the diploma of the Apothecary is looked upon by the poorer classes more as a symptom of a longer bill than as a test of higher qualification.

We are told that in some populous districts the distinction between the Apothecary and the Druggist scarcely exists, and a kind of competition prevails which is ruinous to both parties. The Apothecary, being a professional man, and making Pharmacy subservient to Medical Practice, is satisfied with a small profit on the retail part of his business, and obtains a reputation for *cheap physic;* while the Chemist, depending for his living upon the sale of his medicines, and making counter practice subservient to this object, keeps his connexion together by giving *advice gratis.* Thus each takes away the legitimate business of the other. The Apothecary possessing the superior qualification, claims the right of practising Pharmacy as well as Medicine, to any extent that

suits him; the Chemist, possessing no legal qualification or protection, defends himself in the best way he can, by trenching on the province of the Apothecary. Although these remarks do not apply to Apothecaries and Chemists of the first class, the abuse exists to a sufficient extent to mislead the public, especially the poorer classes, who think one "doctor's shop" as good as another.

But the difficulty does not end here. Many persons who are quite aware of the difference between an Apothecary and a Chemist, object to calling in a medical man on every trivial occasion. They resort to their own nostrums and family receipts, and in the application of these remedies the Chemist is sometimes consulted, not as a medical man, but as a person who, from his constant manipulation of medicines, is supposed to know something about their effects. The Chemists being under no legal jurisdiction, and having until lately been destitute even of a conventional government among themselves, each individual has had no guide but his own discretion to regulate the extent to which he should follow up this counter practice, and it would have been surprising if, under these circumstances, some had not carried it further than strict propriety could justify.

The public must be considered chiefly responsible for any evil which may result from this practice, as those Chemists who are the most anxious to avoid it find great difficulty in doing so, without offending their customers. A refusal to recommend a simple remedy is in some cases construed into incivility or indifference, in others to absolute stupidity; and patients will scarcely believe that a man possessing an ordinary share of common sense, and having been many years in business as a Chemist, can be ignorant of the nature and effects of ordinary medicines to which they often themselves resort, without any advice at all.

Notwithstanding this inconvenient prejudice in his favour, the Chemist labours under great disadvantages, for if his advice happen to prove prejudicial in any case, care is taken to publish all the particulars; but if a medical man were to have the same misfortune, it would be passed over in silence. On the other hand,

nothing is said about the cases in which Chemists afford relief; while medical men have the opportunity of reading the details of their cures before learned societies, and publishing them in the journals.

It must be admitted that Chemists are sometimes successful in their practice and sometimes otherwise. If their success preponderates over their failures, the public derive the benefit, and the members of the profession suffer a hardship in being deprived of a share of the remuneration to which they are entitled as qualified practitioners who have undergone an expensive education. If, however, the failures of the Chemists preponderate over their success, and slight ailments are aggravated by them into serious maladies, the members of the profession have no right to complain, as their harvest is thereby increased.

It is therefore a question whether the counter practice of the Chemists is beneficial to the public and injurious to the profession, or whether it is injurious to the public by giving rise to more employment for the profession. If it be so injurious to the public as we are sometimes told it is, we cannot but admire the disinterestedness of those who so strenuously advocate the abolition of a practice which, by their own showing, is beneficial to themselves by increasing rather than diminishing the total amount of illness from which their income is derived. We should be glad to see our brethren follow this example of disinterestedness, and voluntarily withdraw as much as possible from an office for which their education does not qualify them, except to a very limited extent, and by following which, in our opinion, they materially injure their dispensing and retail business by exciting the jealousy of medical men and inducing Apothecaries to sell drugs.

Various proposals have been made for establishing a boundary line between the province of the Apothecary and that of the Chemist; and it is to be regretted, that so much difference of opinion exists on this subject. It is obvious that some concessions must be made on both sides, and that more advantage may be gained by a mutual accommodation and arrangement between the

parties concerned, than by any sudden revolution brought about by Act of Parliament, even if this were practicable. A medical man would not attempt to cure a chronic disorder of long standing with a single dose of medicine, neither is it judicious in medical reformers to endeavour to eradicate at one fell swoop an innovation which has existed for upwards of half a century.

We have always contended that it is not desirable for the Members of our body to become Medical Practitioners, and have endeavoured to persuade our brethren to exercise that kind of judicious restraint upon themselves, in counter practice, which would prove that legal restraint in this respect is unnecessary. The PHARMACEUTICAL SOCIETY has never claimed for its Members the "privilege" of visiting patients, and every opportunity has been taken to inculcate the necessity of extreme caution, even in those trivial cases which may appear not to demand medical aid. The attention of the Members has been directed to Pharmaceutical subjects, and it has been the object of the Council to encourage an adherence to those pursuits which are especially our province, and by the cultivation of which we may hope to raise our professional character.

We look forward to the time, when it will be considered as much beneath the dignity of a Pharmaceutical Chemist to become an irregular Medical Practitioner, as it would be derogatory to a Physician to practise Pharmacy. *Legal restrictions, when opposed to public prejudice, will always be evaded; but improved education, and the moral influence of a properly regulated Pharmaceutical Institution over its members will be found a more effectual restraint than a stringent but inoperative Act of Parliament.*

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF A LECTURE

UPON THE

CLASSIFICATION AND STRUCTURE OF THE LEECH,

DELIVERED BEFORE THE MEMBERS OF THE PHARMACEUTICAL SOCIETY.

BY H. LETHEBY, M.B.,

Late Lecturer on Comparative Anatomy and Physiology in the Medical School of the London Hospital.

The lecturer commenced by adverting to the position which the leech occupies in the animal kingdom, showing that it belonged to the *Annelida*, the first class of the sub-kingdom *Articulata* or *Homogangliata*. This class, which includes the worms properly so called, has been divided into four orders, one of which, the *Annelida suctoria*, is principally composed of the family *Hirudinea* or leeches: they are known by their having a soft, naked, segmented body, terminated at each extremity by a prehensile sucking disc. The anterior one has the mouth in its centre, and *may or may not be armed with teeth.* The intestinal canal is sacculated. They have red blood, which is kept circulating, or rather undulating, by the pulsation of four longitudinal vessels. Their respiration is cuticular. The nervous system consists of a brain and ventral chain of ganglia. They have from two to ten eyes, situated upon the dorsal surface of the anterior segments. They are reproduced by ova, and the sexes are combined. The family may be divided into eight genera: thus,

Genus 1. Clepsine, (Sav.), *Erpobdellæ spec.* (Lam.), *Glossopora* (Johnson), *Glossobdella* (Bl.). *Body* composed of 76 segments. *Eyes* 2, 4, 6, arranged in longitudinal lines. *Jaws* reduced to three folds, without teeth.

Genus 2. — Hæmopis (Sav.), *Hirudo sanguisuga* (Lam. and Johnson), *Hippobdella* (Bl.). *Body* composed of 98 segments. *Eyes* 10, disposed in a curved line; six on the

first segment, two on the third, and two on the sixth. *Jaws* tolerably large, not compressed; having about 15 blunt, flattened, and loose teeth.

Genus 3.—Sanguisuga (Sav.), *Iatrobdella* (Bl.). *Body* composed of about 100 segments. *Eyes* 10, arranged as in the preceding. *Jaws* large, well developed, compressed laterally, and bearing about 80 sharp firmly-implanted teeth.

Genus 4.—Limnatis (Moq. Tand.), *Bdella*, (Sav.). *Body* composed of 98 segments. *Eyes* 8, arranged in a semicircle; six on the first segment, and two on the third. *Jaws* hard and oval, but without teeth.

Genus 5.—Aulastoma (Moq. Tand.). *Body* composed of 95 segments. *Eyes* 10, disposed in a curved line; the four posterior being smaller and more isolated. *Jaws* reduced to a multitude of little folds, without teeth.

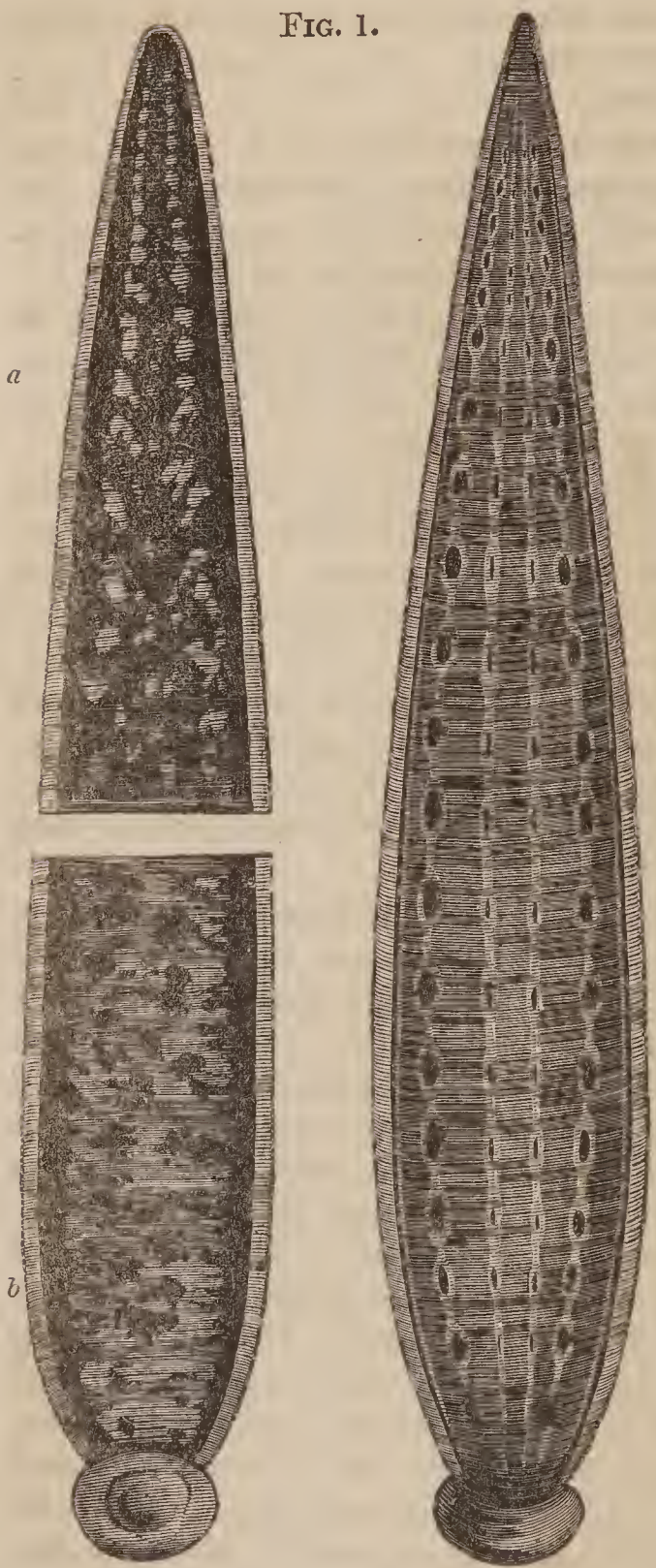
Genus 6.—Nephelis (Sav.), *Erpobdella* (Bl.), *Heluo* (Oken). *Body* composed of about 100 segments. *Eyes* 8, very distinct; the four anterior disposed semicircularly on the first segment, the other four on the third, either in a transverse or longitudinal direction. *Jaws* reduced to three distinct folds, without teeth.

Genus 7.—Piscicola (Lam., Moq. Tand.), *Hæmocharis* (Sav.), *Ichthyobdella* (Bl.). *Body* composed of innumerable segments. *Eyes* 4, 8, not distinct. *Jaws* reduced to three ridges, without teeth.

Genus 8.—Albione (Sav.), *Pentobdella* (Leach, Bl.). *Body* composed of 58, 63, 65 segments, more or less tuberculated. *Eyes* 8, disposed in a transverse line. *Jaws* reduced to three points, hardly visible, and without teeth.

Such are the several genera of the family *Hirudinea*, and it will be seen that the genus *Sanguisuga*, or blood-sucking leech, is the only one of the eight whose jaws are capable of wounding the skin: it therefore becomes a question of considerable importance how to distinguish these; and the lecturer stated, as his opinion, that the Sanguisuga may be known by one or both of two characters. They have a continuous longitudinal stripe of a yellow or orange colour along each margin or side of the body; and secondly, when the abdomen is of a lighter tint, there should *always* be two lateral black stripes—one running down on either side. Every leech that did not present these, which may be called generic characters, should be rejected. A careful examination of a great number of leeches which have from time to time reached our markets, had led the lecturer to divide the genus Sanguisuga into seven species, which are more or less valuable as remedial agents: thus,

Fig. 1.



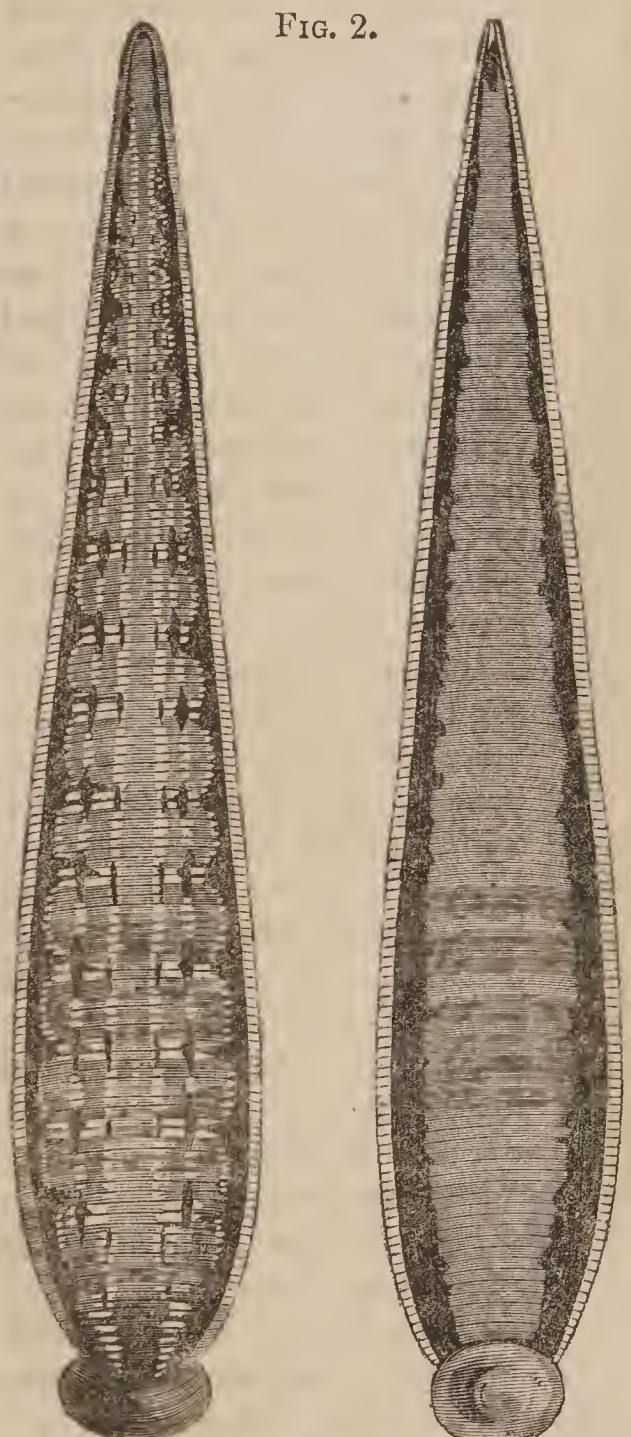
SANGUISUGA MEDICINALIS.

Species 1. SANGUISUGA MEDICINALIS (Sav., Moq. Tand., Brandt). *Hirudo medicinalis* (Linn. Mul. Cuv. Car. Johnson). *Sangsue médicinale grise* (Bl.), *Hirudo officinalis*, (Derh.) *Old English or speckled leech. Hamburgh grey, or Russian leech.* (Fig. 1). Characters:—*Back* dark olive, and sometimes almost black or brown, with six well-marked orange or rusty yellow longitudinal bands — two being quite marginal, and the other four dorsal; of these four the two outer are generally interrupted at regular intervals by very black spots or dashes, and frequently similar but smaller markings are seen on the two inner bands. *Belly* dirty yellowish, or light olive green, spotted more or less with black (fig. 1, *b*), sometimes so thickly as to leave but an occasional mark of green (fig. 1, *a*); when the spots are fewer in number, they are clustered along the margin of the abdomen so as to form an irregular black stripe. This is the most valuable of our commercial leeches, drawing a large quantity of blood quickly and easily. It fetches in the market at this time 18*s.* per 100; it is imported, by way of Hamburgh, from the northern countries of Europe, such as Russia, Norway, Sweden, &c.; it was formerly collected in our own marshes, but from the combination of two circumstances, a large demand and a destruction of its haunts by an improved system of drainage, it is now nearly,

if not quite extinct, and there appears to be a great difficulty in naturalizing the imported specimens.

Species 2., SANGUISUGA CHLOROGASTER, (Brandt), is now and then met with among the speckled leeches from Russia; it has a *back* coloured exactly like the preceding, but the *belly* is of a brighter green tint, freckled with numerous small brownish red spots. It was first described by Brandt as occurring at St. Petersburg, and appears to be of as good a quality as the S. medicinalis.

FIG. 2.

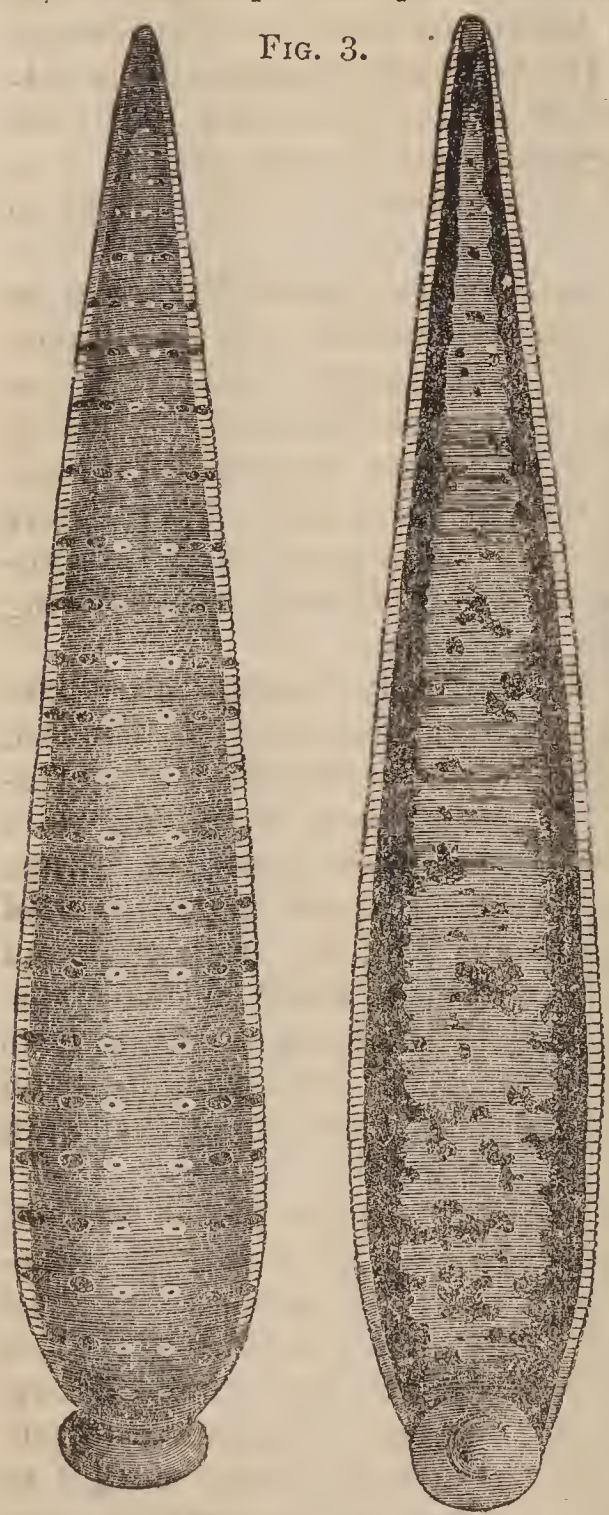


SANGUISUGA OFFICINALIS.

Species 3., SANGUISUGA OFFICINALIS, (Sav., Moq. Tand., Brandt). *Sanguisuga meridionalis*, (Risso). *Sangsue médicinale verte*, (Bl.). *Hirudo officinalis*, (Geiger). *Hirudo provincialis*, (Carena). *Hamburgh and French green leech.* (Fig. 2.) Characters :— *Back* brownish olive-green, with six yellow or reddish longitudinal bands, the two marginal and the two central being the most evident, while the intermediate ones are rarely continuous or so well marked, and the spots or dashes which occur upon them at regular intervals, appear to be made up of smaller dots, which give them a ragged outline. *Belly* light dirty pea-green, or sometimes yellowish green, quite free from spots, but exhibiting the two lateral black stripes. There are two varieties of this species in commerce, one being collected in the central parts of Europe, and called the *German* or *Hamburgh green;* it is the largest and best, fetching at this time 15*s.* per 100. The other variety is collected in the more southern countries, and is known as the *French* or *Spanish green*; they are of less value, rarely making more than 11*s.* per 100; they are of small size, and very

unhealthy from a fraud which the natives are guilty of before exporting them, that is of filling them out with blood so as to improve their appearance, and make them look larger; they are consequently very indisposed to bite, and must be kept some time in the importer's ponds before they are saleable.

FIG. 3.



SANGUISUGA INTERRUPTA.

Species 4., SANGUISUGA INTERRUPTA, (Moq. Tand., Brandt). *Sangsue interrompue* (Audouin). *Sangsue marquetée*, (Bl.). *The interrupted Gibraltar green, or Morocco leech.* (Fig. 3). Characters:—*Back* of a beautiful pea or grass green; sometimes in the smaller varieties it has an ochre or brownish tint. The two marginal bands yellow, broad, and well marked, but the dorsal so interrupted as to be indicated only by a succession of spots, which occur at about every fifth ring. The two central rows are of a bright orange colour, while the two external and parallel spots on each side are black, the innermost being fringed with yellow. *Belly* generally of a duller green, spotted or unspotted, to the two marginal black bands are always well marked. These leeches are collected in Morocco, where they yield a large revenue to the emperor, and are exported by way of Gibraltar. They frequently run of large size, are of good quality, and fetch about 14*s*. per 100.

Species 5., SANGUISUGA VERBANA, (Moq. Tand., Brandt, Carena). *Sanguisuga carena*, (Risso). *Sangsue médicinale de verbano*, (Bl). *Sangsue du Lac Majeur*, (Audouin). Characters:—*Back* deep dirty green, with the two lateral or marginal bands rusty yellow; along the middle of the back there is a double row of longitudinal ochre yellow stripes, each stripe running for the space of three rings; the back also exhibits a series of black transverse bands, which occur about

every 6th ring. *Belly* brownish green, either without spots, or very small ones. This leech is common in some of the Italian lakes; it has not, to my knowledge, reached our market, and from what I can learn, it is of bad quality.

Species 6., SANGUISUGA OBSCURA (Moq. Tand). *Sangsue Noire* (Bl). *Back* either dark rusty brown, or black, with the central dorsal bands very indistinct. The two lateral bands orange yellow. *Belly* greenish, spotted or not. This variety is frequently met with among the Spanish and French green; it is called the *dark Spanish*, and is of about the same value; it does not bite very readily.

Species 7., SANGUISUGA MARGINATA.—Such is the name by which the lecturer proposed to call a leech which has been sometimes imported from Spain. Its distinguishing characters are an almost black or very dark green *back* and *belly*. Having no spots, but a very bright yellow or orange marginal band running the full length of each side of the body. There have been but few samples imported, and these were found of comparatively inferior quality, biting with difficulty, and drawing but little blood.

Several species, continued the lecturer, besides the above have been described by Savigny, Derheims, Moquin Tandon, Blainville, and others; but none which he conceived of consequence. The following rules he proposed to lay down as a guide in the choice of leeches. The best have *six yellow or reddish longitudinal stripes along the back, and a spotted belly*. The next in order of value has the belly unspotted, and the larger they are, provided they have no blood in them, the better. The third in the list has a bright green back, with no dorsal stripes, but in their place six or eight rows of spots; and the least valuable are the leeches which have no marks at all upon their backs.

The lecturer then directed attention to the diseases of leeches, one of the most common forms of which exhibits itself as a constriction at some part of the body, as if a thread had been tied round it. These rarely recover, and will not always bite—a healthy leech is known by its contracting firmly into an oval mass when it is rubbed between the hands. It is a question with many whether leeches, after they have once bitten, should be employed again, and no doubt when they have attacked a contagious surface, there is some risk; but generally speaking, if the leech, after it has sucked, is drawn carefully, and not too quickly, between the finger and thumb, it may be emptied of its gorge, and in about three weeks is quite ready for another application.

[The remainder of the lecture, which relates to the ANATOMY OF THE LEECH, is unavoidably postponed until next month.]

PHARMACEUTICAL MEETING,

NOVEMBER 13th, 1844.

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

ON THE IMPORTANCE OF VENTILATION.

BY MR. P. SQUIRE.

I AM induced to bring the subject of ventilation before our Society, from a conviction, founded on experience, that should it be generally adopted, not only will it add greatly to the comfort, but will operate most beneficially in preserving the health of those whose occupation is confined to the closed shop during the winter months, with scarcely any other means of supplying fresh air for respiration and combustion than the accidental opening of the street-door. Whilst oil and candles were employed as illuminating agents, the inconvenience was not so seriously felt as it is in the present day, when so much more heat is produced by lighting up with gas. I have long lamented the half-suffocating atmosphere thus produced, and it was not until about this time last year that I turned my attention to the subject with a view of remedying the evil. The chief cause of my commencing this was, the very interesting lecture delivered by Dr. Faraday at the Royal Institution, in April, proposing a plan of ventilating light-houses, and another for rooms, the Athenæum Club-house in particular, where, for want of ventilation, the vapour and acids from the gas-lights had destroyed the greater part of the binding of the books. One of these was a tube to dip into the gas glass or chimney, and induce all the products of combustion to ascend and escape by pipes through the ceiling; and the other — more complicated — was "the descending flue," formed by placing on the outside of the regular glass chimney a larger one, covered with a double plate of mica; the glassholder, having an aperture between the two glasses for the down-current to pass into the bracket, and curving upwards, becomes the flue to carry off the air which has served for the combustion. This descending flue answers for an inner apartment, where a good draught can be depended upon, but, I am told, not where doors are frequently opening to the cold air. The expensive character of its fittings, too, is an objection to its general adoption, but its elegant light, and the products of combustion being most securely excluded from the apartment, recommend it strongly to the wealthy, or to societies and in-

stitutions whose funds may afford the outlay. The tube dipping into the glass chimney answers very well, and may be employed, when the unsightly appearance of the copper tube is of no consequence; it must, however, be borne in mind, that water will condense in this tube if it has far to travel before it delivers the products of combustion.

I now come to the form of apparatus which I employ, and which I think is perhaps the most simple and least costly of any that I can recommend for general adoption, taking all its advantages into the account: it consists of an iron gas pipe, $1\frac{1}{4}$-inch in diameter, having a *diminishing connector* as it is called (capable of receiving a 2-inch pipe at one end, and connecting the other with a $1\frac{1}{4}$-inch pipe) screwed on to its aperture. This forms the cap to drop over the mouth of the glass chimney. Each of the lights will require one of these capped pipes, and it may approach the glass chimney within $\frac{1}{8}$th of an inch, or drop close over it. These are connected with a pipe in the ceiling, which conveys through the joists the products of combustion into the nearest chimney; the pipe is surrounded by a circular tube of sheet iron, about nine inches in diameter, or if there are several lights, six inches may do for each, and they must be flattened, if they cross the joists to get to the chimney, as indeed mine do. This flue of sheet iron commences at the ceiling, passing the whole course of the pipe to the chimney, and answers admirably in carrying off the vitiated and heated air which collects under the ceiling. The iron pipe rising direct from the gas light to the ceiling, if left naked, radiates a considerable quantity of heat, and this can either be used as a warming agent, or the pipe can be cased with a loose tube of bronze, or better still by ornamental porcelain, or by opaque glass, which will stop half the heat. The heat by this arrangement draws up to the perforated ventilator which covers the opening of the sheet iron flue, and is thus got rid of: the iron gas tube retains the heat so well, that all the water produced by the combustion of the gas, is carried in the shape of vapour up the chimney. If the pipe is in the centre of the casing of sheet iron, it removes all possible qualms as to the probability of risk of fire—the inspector of the Phœnix informs me that my insurance is not affected by it. Thus the ceiling does not become blackened by the smoke from imperfectly burnt gas, nor does the water stream down the windows in cold weather, destroying every metallic, mahogany, or papered article, it may fall upon; for the unconsumed gas, the carbonic acid resulting from combustion, and the air which has been respired, are got rid of by these means. Means must be taken for the admission of fresh air, without which, it must be evident no ventilation can go on; and very much depends upon the manner in which this part of the plan

is carried out, as the admission of a large undivided stream of cold air could not be borne in severe weather. I have made an opening in the wall, and my waste steam-pipe from the kitchen boiler traverses a series of pipes set in the opening, all terminating in a tinned copper vessel which receives the condensed water, and thus I employ that which was a nuisance in my kitchen chimney to warm the cold fresh air as it enters the apartment, and I gain by that arrangement about five gallons of distilled water daily, which, in small establishments, would be a sufficient supply, without the expense of a still, and be considered as one among the many inducements to ventilate. A perforated zinc plate, for the air thus warmed to pass through and diffuse itself into the apartment, completes the arrangement.

It is somewhat surprising that more progress has not been made in domestic life with regard to ventilation, the subject having been very ably handled by talented men for more than a century. Various plans for removing the vitiated air, and supplying fresh, have been suggested. In the *Philosophical Transactions* for the year 1735, Dr. Desaguliers proposed a fanner, which, on the small scale, is called Clarke's blowing-machine; and the air-pump and bellows have also been applied. A very ingenious application of the former of these has lately been made by Dr. Arnott, which even measures the quantity, whilst it ensures a supply to any extent. The screw, patented by Mr. Day, is another means employed on many occasions. The window fan, or rotary ventilator, placed in windows, only serves to divide the stream of air, and so do the louvres made of plate glass.

Sir Humphry Davy applied a furnace to a flue at the roof of the House of Lords, and thereby caused the vitiated atmosphere to ascend and escape. The present House of Commons is exhausted by a furnace in a shaft, the fresh air being supplied through innumerable holes pierced through the oak floor, which is covered by an elastic hair carpet. The air, previous to its admission, is strained from blacks and floating impurities, by a veil forty or fifty feet long, it is then warmed to any required degree by hot water-pipes, and as the furnace sucks out the air from the roof, the warm and pure air rises through the whole of the floor.

The detail of this beautiful arrangement, together with an infinite variety of others, illustrated by hundreds of wood-cuts, will be found in Dr. Reid's book, just published, called *Illustrations of Ventilation*, a work full of valuable information, conveyed in a familiar and simple manner, and which cannot fail to interest any one desirous of being informed of its principles. Under the direction of Dr. Reid, are the ventilating

arrangements of the new Houses of Parliament, which, from the description I have been favoured with by the doctor, I should think will be the most perfect, and upon a scale of course more extensive than anything this country at present possesses. I find several of the club-houses are at this time incurring great expense for the purpose of ventilation; the Junior United Service Club has undergone great alteration to adapt it to the means required; the cielings and floors have had tubes and flues placed in them similar to the plan I have adopted; but they rise behind the grate in the room above, opening to the chimney, instead of going into the chimney of a lower apartment through the joists. They have constructed also the best shaft the building will admit of, to carry off the foul air from all the apartments it can be connected with, the flue is heated by steam pipes. The Conservative Club, in St. James's Street, has the advantage of the ventilating arrangements being embodied in the architectural design, and the fresh air is heated by Perkins's patent water-pipes, and admitted under the columns or skirtings; the foul air is sucked out through the cornices, which are ingeniously designed for the purpose. Flues are sometimes heated by a furnace. Mr. Hazard, of Bristol, has a patent for this mode of heating air; but I think if the pipes can be made secure, the hot-water plan is the best.

Mr. Grant (late of Her Majesty's ordnance department), has patented a plan of ventilating rooms, which is done in this way:— Three or more conical glasses supported above each other in succession, and overlapping, convey the foul air from the lamp to the ceiling, where the last one enters a stone flue, which is placed between the floors, terminating in the chimney or open air; an outer tube of sheet-iron serves to carry off the heated and vitiated atmosphere of the room. He considers that by employing a succession of cones, he ventilates better and guards more completely against the downward current which sometimes takes place. The earthenware tube he thinks is decidedly superior to that of metal, because acquiring heat slowly it retains it longer, and ensures a more permanent current, the vapour passing without condensation. In this way he has ventilated the School of Design (Spitalfields branch), which can be inspected, by permission of the manager, on producing Mr. Grant's card, any evening from half-past seven to eight; the Adelaide Hotel, London Bridge; the Committee-room and the Library of the Lecture Hall of the Greenwich Institution; the Board-room of the Union, Whitechapel, and several others, with uniform success. It is applicable for all kinds of lights and all descriptions of dwellings or shops, and is delivered over to the gas-fitter with the adaptations of unions and connections for his work at a very reasonable rate.

I think well of Mr. Grant's plan. The stone-ware not radiating so much of the heat, conveys it into the chimney, where it is employed to warm the shaft and assist in keeping up the draught, and is less objectionable when in contact with wood.

Mr. Rucker's mode of single ventilation deserves to be mentioned: it is a suspended light, having a globe screwed on the bottom of the brass-work supporting the burner, and the air glides down the sides of the globe, and is warmed before it has to support the combustion; it then passes up the hollow stem which suspends the lamp, and is the outlet for the spoiled air; there is one in operation at 320, Oxford Street.

Having pointed out the different plans for ventilation, we may take a survey of the different burners that are employed for gas lighting: the bude, which once burnt oil and oxygen, now used for burning gas; Boccius burner, a similar one to that of Gurney, both requiring a metal tube within the upper part of the glass chimney: these are for lighting on a large scale, and therefore not so frequently required as the argand burner, which has been made into all shapes: that by Leslie into a ring, gives a good light, and being of thin metal, does not detract from the heat at the point of combustion so much as the stronger made ones. Luntley's is a flattened ring, and the gas is burnt at the very bottom of the glass chimney. Platow puts a cone in the glass-holder, pierced with holes at its base, the current of air thus passes between the hot surfaces of the brass, and is warmed, and the flame is steady. Dochree's burner delivers the gas at four holes concealed in a groove, and the gas rises and ignites as a circular sheet of flame. The Scotch jet, called the fish-tail, appears to be the favourite for economy, and burns the gas most perfectly, requiring no regulation if it have but sufficient pressure. Warming the gas is a desideratum; and I think it is Mr. Smith who brings the supply tube over the flame for that purpose. Dr. Reid brings the supply tube down the centre of his radiating light, which is a beautiful arrangement of the Scotch jet in a circle, so that the flat flames resemble the spokes of a wheel; a circular flue surrounds it, and the draught of air, rushing through the leaves of the flame, prevents the tube from becoming too hot, so that the gas comes highly heated to the point of escape without being decomposed—a beautiful light is obtained, together with ventilation, and no glass is required. Glasses are not only an additional expense to gas lighting, but some light is lost by their use, and when they become dirty from any cause, the loss is greatly increased; it is true they soften the light, but if the lights are placed high, and we get the reflected light from the walls, the glasses may be dispensed with. There is a light of Dr. Reid's placed under the ceiling of the Speaker's room in the House of

Commons, in the centre of a neat perforated zinc pendant, which gives a beautiful light to read by, although it is perhaps ten or twelve feet above your head—the pendant serves as the ventilator to the room, and the pure air is admitted appropriately near to the floor.

Naphthalizing the gas increases its illuminating power; that which volatilizes at a low temperature should be employed, and not too much introduced, otherwise you obtain a reddish flame instead of the star-like bright light.

The usual argand burner consumes about five cubic feet of gas per hour, producing rather more than five cubic feet of carbonic acid, and nearly half a pint of water.

Shops using thirty of these lights therefore, in an evening of four hours, produce upwards of nine gallons of water, holding in solution the noxious products of the gas.

An argand lamp, burning in a room twelve feet high and twelve feet square, containing 1728 cubic inches of air, with closed doors and windows, produces sufficient carbonic acid in rather more than three hours to exceed one per centum, which is considered unfit for respiration, and when it amounts to ten per cent. it is fatal to life.

A man makes on an average twenty respirations per minute, and at each respiration inhales sixteen cubic inches of air; of these 320 cubic inches inhaled, thirty-two cubic inches of oxygen are consumed, and twenty-five cubic inches of carbonic acid produced.

These are data for our consideration; and I trust will lead many to think seriously about making their knowledge practically useful. The following extract from the pamphlet of Mr. Ritchie, published this year on the ventilation and warming of factories, puts in a very clear manner the importance of pure air. He says, "If the various convolutions of the air-cells of the lungs were spread out, they would present a surface *thirty times* as extensive as the surface of the body; that over this extensive surface, through exceedingly minute vessels, the entire blood of the body passes every three minutes; that we respire every twenty-four hours a quantity of air that would fill upwards of seventy-eight hogsheads, and the blood passes upwards of 500 times in the course of the day through the lungs, exposed to the enormous quantity of air which we respire. * * * Thus in proportion as the impurities exist, the air we breathe becomes a slow or more rapid poison."

ON THE PREPARATION OF CINNAMIC ACID,

BY GEORGE FOWNES, PH. D.

Lecturer on Chemistry to the Pharmaceutical Society, and the Middlesex Hospital Medical School.

This interesting substance, first discovered by MM. Dumas and Péligot as a product of the oxidation of the essential oil of cinnamon, was afterwards shown to exist, often in considerable quantities, in the balsams of Tolu and Peru, being apparently in these cases also produced by an oxidizing action upon certain of the fluid or oily constituents of the balsams, which are observed to become harder and more solid by the effects of age, and in this state to yield larger quantities of the acid.

A very simple process for the preparation of cinnamic acid from Tolu balsam is given in the second volume of the *Transactions of the Pharmaceutical Society*, p. 473, by Mr. G. Heaver. The balsam is introduced into a retort, and subjected to distillation without addition of water or any other substance; it fuses, and gives up a little water and fragrant volatile oil: these are succeeded by the cinnamic acid, which condenses in the solid form in the neck of the retort. Towards the close of the distillation a heavy empyreumatic oil passes over, contaminating, to a certain extent, the product. This is directed to be separated by pressure between folds of bibulous paper, after which the acid is purified by crystallization from a large quantity of boiling water. The product is described as very abundant.

In repeating this process with a view of preparing a considerable quantity of cinnamic acid for experimental purposes, I experienced considerable difficulty in getting completely quit of the above-mentioned empyreumatic oil, which has a very powerful and disagreeable odour of kreosote, and communicates considerable colour to the acid: it struck me therefore, that one of the methods employed for the separation of benzoic acid from benzoin, might be applicable to this case, and on trial it was found to succeed in a very complete manner.

Old, hard, Tolu balsam was reduced to powder and intimately mixed with about an equal weight of slaked lime; this mixture was boiled in a large quantity of water for an hour or more, filtered boiling-hot from the insoluble compound of resin and lime, and the solution mixed with an excess of hydrochloric acid. On cooling, a copious crop of slightly-yellow platy crystals were obtained, which were drained upon a filter, while the mother-liquor was neutralized with hydrate of lime and again boiled with the resin-compound, the whole placed upon a filter, and the solution decomposed by hydrochloric acid, by which, on cooling, a second crop of crystals was obtained. The impure

acid thus procured was thrown into boiling water, and a slight excess of hydrate of lime added; a little bone-black was then introduced, and after a few minutes, the solution filtered. On adding hydrochloric acid, and leaving the whole to cool, the acid of the balsam separated in beautiful snow-white platy crystals.

The acid thus abundantly obtained, was next subjected to analysis with a view of verifying its nature. A portion of the first crop of crystals, still further purified by re-crystallization from boiling water, gave the following results:—

	(I.)	(II.)
Acid employed	5.245 grs.	4.922 grs.
Carbonic Acid produced	13.76 "	12.89 "
Water produced	2.45 "	2.34 "

Hence in 100 parts:—

Carbon	72.54	72.41
Hydrogen	5.19	5.28
Oxygen	22.27	22.31
	100.	100.

The acid obtained from the mother-liquor, carefully purified, was then examined; it appeared decidedly more soluble in hot water than the preceding:—

	(I.)	(II.)
Acid employed	4.733 grs.	4.86 grs.
Carbonic acid produced	11.84 "	12.20 "
Water produced	2.12 "	2.17 "

	(I.)	(II.)
Carbon	69.17	69.41
Hydrogen	4.98	4.96
Oxygen	25.85	25.63
	100.	100.

This is evidently benzoic acid, and not cinnamic, as will be seen by a comparison with the composition of the two acids reckoned to 100 parts:—

	Cinnamic Acid.	*Benzoic Acid.*
Carbon	73.30	69.28
Hydrogen	5.34	4.86
Oxygen	21.36	25.86
	100.	100.

Its properties too corresponded completely with those of benzoic acid. The specimen first analyzed however is clearly cinnamic acid, containing some benzoic, as the deficiency of carbon indicates. These results coincide with the observations of M. Deville,* who found both these acids in the balsam of Tolu; and, indeed, from subsequent experiments, it appeared that in the whole quantity of the mixed acids obtained from the balsam, the proportion of benzoic acid greatly preponderates.

* *Ann. Chim. et Phys.*, 3d series, iii, 151.

The two acids may be separated to a certain extent, as the preceding experiments prove, by mere crystallization from water, several times repeated, the cinnamic acid being by far the least soluble of the two, both in hot and cold water. A more perfect method, however, is found in the still more unequal solubility of their lime-salts, the cinnamate of lime being almost as sparingly soluble both in hot and cold water as the acid itself, while the benzoate only requires for solution thirty parts, or less, of water at the common temperature of the air.

Accordingly, if the original solution filtered from the lime and resin-compound of the balsam be merely suffered to cool, without addition of acid, a very large quantity of cinnamate of lime separates, which only requires to be re-dissolved in boiling water, treated with a little animal charcoal, and re-crystallized, to yield the pure and perfectly white salt in tufts of small circular crystals, from which the free acid can of course be prepared in an equally pure state. The mother-liquor yields an additional quantity of impure cinnamate of lime; and lastly, a large amount of benzoic acid retaining a little cinnamic.

Some of the cinnamic acid, prepared in the above manner, was subjected to analysis; its purity is evident:—

Acid employed	4.915 grs.
Carbonic Acid produced	13.04 "
Water produced	2.41 "

Carbon	73.36
Hydrogen	5.44
Oxygen	21.20
	100.

Should cinnamic acid ever come into request as an article of Pharmacy, the preceding process may possibly become useful, as it is equally simple and certain.

It is stated by M. Dumas, that cinnamic acid is converted by powerful oxidizing agents into benzoic acid; and that chlorine, in the state of chloride of lime, produces a similar effect. I found, on repeating the experiment with a mixture of bichromate of potash, cinnamic acid, and sulphuric acid, that this change took place with the greatest facility, and that it was accompanied by a copious evolution of carbonic acid gas. The reaction, which is very sudden and violent, is explained by the subjoined diagram:

Cinnamic Acid	C_{18} H_7 O_3	Bitter-Almond Oil	C_{14} H_6 O_2
8 eq. Oxygen	O_8	1 eq. Water	H O
		4 eq. Carbonic Acid	C_4 O_8
	C_{18} H_7 O_{11}		C_{18} H_7 O_{11}

The bitter-almond oil is afterwards more or less converted by further oxidation, in a manner well known, into benzoic acid.

The action of nitric acid upon cinnamic acid is similar, but less energetic and complete: it is attended by a copious evolution of red fumes, accompanied by a strong smell of bitter almond-oil. This character may be taken advantage of as a rough but ready method of distinguishing cinnamic acid from benzoic, by heating a little of the sample in a test-tube with a few drops of nitric acid. Benzoic acid is unaffected in such circumstances; it merely dissolves in the hot acid, and crystallizes out on cooling in masses of radiated needles.

In no case, however, was benzoic acid observed as a product of the action of chlorine on cinnamic acid. In one experiment cinnamic acid was boiled for a long time with a solution of chloride of lime; no benzoic acid could be detected in the filtered solution, which merely deposited, when decomposed by hydrochloric acid, the cinnamic acid which had escaped decomposition. Gaseous chlorine was then transmitted into a boiling solution of pure cinnamic acid in water contained in a retort connected with a receiver. Absorption took place, some hydrochloric acid was produced, while an oily aromatic substance, heavier than water, distilled over with that liquid into the receiver. When examined by ignition with quick-lime, it was found to contain much chlorine. On cooling, the residual liquid in the retort deposited crystals, which, on examination, proved to be merely cinnamic acid.

The solution filtered from these crystals, and concentrated to a small bulk, deposited small white crystals of a substance very soluble in cold water, having a powerfully acid and astringent taste, and a strong acid reaction. It formed sparingly soluble compounds with the oxides of silver and lead; the former was crystalline, and blackened very speedily.

In another experiment, the gas was passed in great excess into the hot solution of cinnamic acid. All the cinnamic acid was destroyed, the fragrant chlorinated volatile oil produced as before, but nothing crystallizable; only a gummy astringent, and an oily or resinous substance, were obtained by evaporation. These products deserve a more complete investigation.

Middlesex Hospital,
Nov. 9, 1844.

ON THE ADULTERATION OF SCAMMONY.

BY JONATHAN PEREIRA, M.D., F.R.S.
Honorary Member of the Pharmaceutical Society, and Assistant Physician to the London Hospital.

The continued, very general, and extensive adulteration of the Scammony usually met with in English commerce, induces me to address the Pharmaceutical Society on the subject; in

the hope that, by publicly calling the attention of the dealers and consumers of this important and valuable drug to the gross sophistications practised on it, and, at the same time, by pointing out simple and easy methods of detecting the frauds, the evil may be lessened, if not, in the end, entirely abated.

I am fully aware that most of the adulterations which I am about to signalize have been practised on scammony before its arrival in this country; and that our dealers are so far not answerable for the frauds thus committed. I am also willing to believe that they would prefer purchasing pure unadulterated scammony, to the sophisticated article usually found in commerce, provided they could sell it at a remunerating price. But many of them purchase inferior sorts because of the excessive competition in the drug market, and the preference given by the consumer for low-priced, albeit adulterated, drugs. In this way a demand is created for inferior (that is adulterated) scammony, and in consequence the importer finds the sale of the adulterated more profitable than that of the pure drug. This statement is not an imaginary one. A few years' ago a merchant imported some pure, or, as it is called *virgin*, scammony, but could not sell it at a remunerating price; while, for the adulterated or inferior sorts, he found ready purchasers. Merchants are thus deterred from importing, and the respectable wholesale dealers from purchasing, pure scammony; which, therefore, becomes scarce and difficult to procure, even at a high price by those who wish to purchase the genuine article. In proof of the accuracy of this statement, I can refer to the experience of the London Hospital drug committee, of which I am a member. The drugs used by the hospital are bought by tender of the most respectable London wholesale druggists, and one of the drugs demanded by the committee is "virgin scammony;" yet for several years not a single sample of pure scammony was offered for sale. Every specimen of scammony sent in is carefully tested in the presence of the drug committee, and the purest purchased, irrespective of price. On one occasion only (viz. in October, 1844) was pure scammony offered to us, when the committee, acting under my advice, purchased 14lbs. at 28*s*. per lb. On inquiry of the respectable druggist of whom this quantity was purchased, I find that no more of it is now obtainable. It was not imported in the usual way of business, but was purchased of a private individual, who had received it from a friend at Smyrna. I have recently met with a sample of scammony which was sold at 5*s*. per lb.! I need scarcely add that it was most grossly adulterated.

If every consumer of scammony would carefully test the article supplied him by his druggist, return the adulterated kind,

and pay a remunerating price for the genuine drug, the evil would soon be remedied. It would then become the interest of the wholesale druggist to purchase, and the merchant to import, none but the pure scammony. I feel satisfied that if a sufficient demand for the genuine article were created, the supply would soon become abundant.

I do not pretend to present much novelty in the present paper. Most of the facts herein stated have been long known to, and described by, both English and Continental Pharmacologists. Hitherto, however, little good has resulted from their statements. Merchants still continue to import, wholesale druggists to sell, and medical men to employ, grossly adulterated scammony. I am willing to suppose that this may arise, in many cases, from non-acquaintance with the facts already published on this subject. In the multiplicity of matters noticed in a general work on Pharmacology, many important circumstances are oftentimes overlooked or lost sight of; and this, perhaps, may be the case with respect to the adulteration of scammony. To obviate this, then, is the object of the present paper. I am in hopes of remedying the evil, to some extent at least, by drawing the special attention of dealers and consumers to the subject by the aid of the Pharmaceutical Society.

The substances which I have detected in commercial scammony, and which have been introduced for the purpose of adulteration, are, *chalk*, *amylaceous matter*, *sand*, and *guaiacum*. To detect these the following tests may be resorted to :—

1. *Aspect.*—The fresh fractured surface of pure or virgin scammony, somewhat resembles that of guaiacum resin; when dry and hard, it presents a glistening resinous lustre, and a greenish black colour. If a small splinter be separated by the nail, it has a grey-brown colour, is brittle, and somewhat transparent.

Adulterated scammony wants the lustre, the colour, the brittleness, and the partial transparency of the genuine article. Its lustre, instead of being glistening and resinous, is either dull (like that of compact grey limestone) or more or less waxy. Occasionally, the fracture of the adulterated kind is glimmering, owing to the presence of small particles of siliceous sand, or of resin. The colour of the adulterated sorts of scammony is usually grey, sometimes interspersed with white spots, owing to the presence of small lumps of chalk.

All the specimens of pure scammony which I have met with, have been in irregular shapeless masses; while every sample of scammony in rounded flattish cakes, has proved to be adulterated, sometimes with chalk, sometimes with amylaceous matter, at other times with both of these substances.

2. *Action of Hydrochloric Acid.*—If a drop of hydrochloric

acid be applied to the fresh fractured surface of pure or virgin scammony, no change is observed.

If hydrochloric acid be added to water through which either *pulvis scammonii* or *pulvis scammonii compositus* has been diffused, no effervescence is observed, provided these powders have been prepared with pure scammony.

Much of the scammony of commerce is adulterated with chalk. Hence, if we apply a drop of hydrochloric acid to the freshly fractured surface of chalky scammony, effervescence immediately takes place. If a little of this kind of scammony be powdered and thrown into water acidulated with hydrochloric acid, carbonic acid is evolved, and a solution of chloride of calcium is obtained, which yields, with a solution of oxalate of ammonia, a white precipitate (*oxalate of lime*). The *pulvis scammonii compositus*, if made with chalky scammony, presents the same phenomena.

If hydrochloric acid be added to water with which some *confectio scammonii* has been previously mixed, no effervescence takes place, provided the confection has been made with pure scammony. On the other hand, if it has been prepared with chalky scammony, effervescence is observed, and a solution of chloride of calcium is obtained.

If a piece of the *extractum colocynthidis compositum*, made with chalky scammony, be formed into a globular mass by the fingers moistened in water, and then dropped into water acidulated with hydrochloric acid, globules of gas (carbonic acid) are evolved from it, and a solution of chloride of calcium is obtained, which yields, as above stated, with oxalate of ammonia, a white precipitate of oxalate of lime. There is, however, one drawback to the value of this test: if the extract be made with pure scammony, it acquires, by keeping, the power of effervescing slightly when put into hydrochloric acid, owing to the conversion of a small portion of the alkali of the soap into an alkaline carbonate.

In conclusion I may observe, that the large masses of virgin scammony frequently appear to have been rolled while soft, in chalk, probably with the view of preventing their adhesion to other bodies. Hence, the whitish grey powder with which virgin scammony is covered, often effervesces, on the addition of hydrochloric acid, though the interior of the mass may be unaffected by the acid.

3. *Action of Iodine.*—If scammony be boiled in water, and to the decoction when cold, a few drops of tincture of iodine be added, no change of colour is produced, provided the scammony be pure. But if the scammony be adulterated with starchy or amylaceous matter a blue colour is developed. The non-production of the blue colour does not prove the purity of the specimen

submitted to this investigation, but merely its freedom from starchy matter; for the sample may be adulterated with chalk though not with starch.

The iodine test is useful for distinguishing the presence of amylaceous matter in *pulvis scammonii* as well as in the *extractum colocynthidis compositum*. For when these preparations are made with pure scammony, no change is apparent in their cold decoctions, on the addition of tincture of iodine. It is not, however, applicable to either *pulvis scammonii compositus*, or *confectio scammonii*, both of which preparations contain ginger powder; and, therefore, even if made with pure scammony, yield a decoction which, when cold, gives a blue precipitate with the tincture of iodine.

4. *Action of Nitrous Fumes.*—If paper, moistened with an alcholic or ethereal tincture of scammony, be exposed to brown nitrous fumes (produced by pouring a drachm of nitric acid over some filings of iron, zinc, or copper, contained in a tumbler or wine-glass), no change of colour is observed, provided the scammony be pure; but if it be adulterated with guaiacum, the paper is rendered blue.

I never met with but one specimen of scammony adulterated with guaiacum. It was sold me as Smyrna scammony; but I believe it to have been a fictitious article, made in this country according to one of the formulæ given in Gray's *Supplement to the Pharmacopœia*.

5. *Quantity and Quality of Resin yielded.*—Pure or virgin scammony, as found in commerce, yields from 75 to 80 per cent. of resin, extractable by sulphuric ether. Picked samples, deprived of their external cretaceous coat, yield 80 per cent. of resin. Before weighing the resin it should be carefully dried at a temperature of about 280° F. (as by an oil bath).

Rectified spirit is less fitted for extracting the resin on account of its also taking up a portion of other matters contained in scammony.

Scammony resin readily dissolves in both oil of turpentine and sulphuric ether. *Jalap resin*, on the other hand, is insoluble in oil of turpentine, and very slightly so in sulphuric ether. Hence, if scammony resin were adulterated with jalap resin, these characters would readily detect the fraud.

If scammony-resin were adulterated with *common resin* or *colophony* (which, like scammony resin, is soluble in both oil of turpentine and sulphuric ether) the fraud might probably be detected by the peculiar odour given out by colophony when subjected to heat.

6. *Incineration.*—If 100 grains of pure or virgin scammony be incinerated in a platinum or Berlin crucible, not more than three grains of ashes remain behind.

But with chalky scammony the matter is far otherwise; some of the worst specimens yielding nearly 40 grains of calcareous ashes, almost entirely soluble in hydrochloric acid.

Some specimens of scammony contain siliceous sand, which remains in the ashes, and is insoluble in hydrochloric acid.

The process of incineration is greatly facilitated by mixing with the scammony either some red oxide of mercury, or nitrate of ammonia. These substances supply oxygen to assist in burning off the carbon of the scammony, and being themselves dissipated by heat, leave no residue.

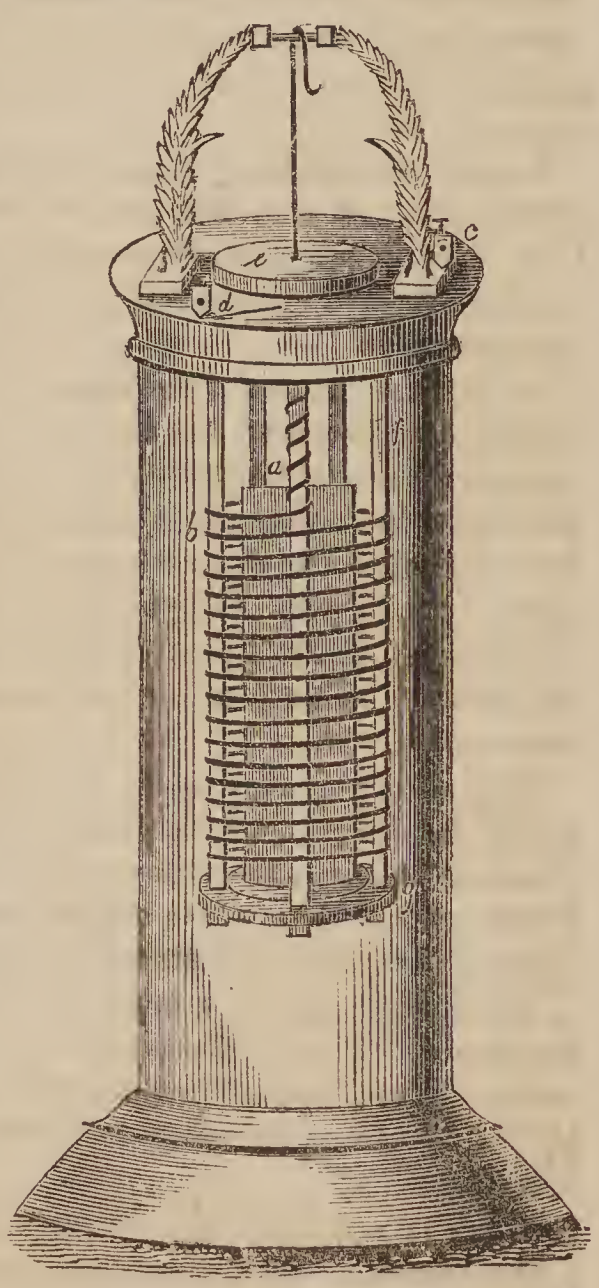
The preceding constitute the most easy and ready means of detecting the ordinary adulterations of scammony.

47, *Finsbury Square, November* 11, 1844.

ENGRAVING ON STEEL AND OTHER METALS BY MEANS OF ELECTRICITY.

Mr. Richard Phillips, jun., exhibited a specimen of *engraving on steel and other metals by means of* ELECTRICITY. (The process is described page 275, as quoted from the *Chemical Gazette*). The cut represents the kind of battery employed for the purpose.

Mr. Phillips observed, one great advantage in this battery is, that the wooden cover prevents the escape of any acid vapours, and keeps the binding screws always clear. He thought that stouter rods of silver wire, with holes through them for the transmission of the smaller spiral wire, would be better than the glass rods. The whole might then be platinized together, and there would be no chance of the spiral getting out of place.



a. The zinc rod.
b. The platinized silver wire.
d. The binding screw in connexion with the wire.
c. The binding screw in connexion with the zinc rod.
e. The wooden plug or stopper.
f. The glass rods.
g. The varnished wooden rings.

THE FOLLOWING DONATIONS TO THE MUSEUM

WERE ON THE TABLE.

Horticultural Society (*through Dr. Lindley*)—Chuquiragua (Chuquiraga insignis). The leaves and young shoots are highly prized by the Indians of Colombia, who use a decoction at the commencement of any kind of fever.—Quillai Bark, from Rio Janeiro—Quina naranjada (orange-coloured bark)—Chelonanthus. This belongs to the Nat. Ord. Gentianaceæ, and is preferred in Popagan to the true cinchona barks ; it is occasionally exported. —Cinchona nitida (Benth.), from the Woods of Fusagasuga, province of Bogota, Colombia.—Cinchona condaminia (cascarilla fina de Urilusinga, from the mountains of Loxa. This is the best and only kind exported.—Cinchona rubra (Benth.), cascarilla colorada, from the cinchona forests of Pitayo, province of Popagan, Colombia.—Five specimens of Cinchonas from the mountains of Loxa—A wax candle, made from the seeds of Myrica macrocarpa, Colombia—Wax, as it is scraped from the trunk of the Wax palm, or Ceroxylon andicola—Eupatorium glutinosum (Matico), from Quito. The powdered leaves used for staunching blood and healing wounds.—Xanthorrhæa Gum from New Holland (two specimens) —Indian Fig Gum (Goma de Nopal), from Mexico—Ducu, from Clusia Ducu, from the monntains near Loxa, Colombia—Goma Mesquitina, from Prosopis dulcis, from Mexico. Used instead of gum Arabic.—Bisulphate of Magnesia, from Colombia.

Mr. Huskisson.—Crystals of bicarbonate of Soda—Ditto white Argol.

Mr. Spencer, jun.—Specimen of Benzoic Acid—Ditto Benzoin.

Mr. G. W. Smith.—Branch with Fruit of Coffea Arabica—Pieces of Stem of Saccharum officinarum — Specimen of Gossypium herbaceum—Specimen of Cashew Nut.

Mr. E. Rea, *Wardour Street.*—Fine orange Lac—Ruby button Lac—Orange Lac (block)—Liver-coloured Lac—Garnet Lac—Orange seed Lac (two specimens)—Dark seed Lac—White shell Lac—Siam stick Lac.

Mr. Tylee, *Bath.*—Specimen of true Barbadoes Naphtha.

Mr. J. C. Monkhouse, *Barnard Castle, Durham.*—Specimens of Minerals and Mineral formations, from a Lead mine in Teesdale, with the products of the Ore in smelting :—Raw Ore, from mines (sulphuret)—Roasted Ore (brouse)—Lead, from smelting furnace—Red Lead (oxyd. rubrum), from smelting furnace—Slag, from smelting furnace—Lead Crystals, from crystallizing process—Rich Lead for refining—Lead Dross, from refining furnace (brock)—Litharge, from refining furnace (oxyd. semi vitreum)—Silver, from refinery—Slag, from refining furnace (draughts)—Lead, from reducing furnace—Slag, from reducing furnace—Lead, from Slag-hearth—Slag, from Slag-hearth (black Slag)—Roasted Fume, from Slag-hearth—Piece of refining furnace bottom (test bottom)—Condensed fumes of Lead (fumes from refining furnace)—Condensed fumes of Lead, (fumes from Slag-hearth)—Crystal of carbonate of Lead—Bisulphate of Lead—Pyrites.

Messrs. Davy, Macmurdo, and Co.—Crystals of Potassio-tartrate of Antimony.

Mr. Calvert, *Paris.*—Specimens of Gallic Acid—Pyrogallic Acid—Succinic Acid—Uric Acid—Hippuric Acid—Anthranalic Acid—Censoic Acid—Salycilic Acid—Camphoric Acid—Alloxan—Cetine—Ethal—Elaidin—Stearic Acid—Margaric Acid—Palmin—Butyrate of Baryta—Butyrate of Lime—Butyrate of Potash—Lactate of Lime—Sacharate of Lime—Salycide of Copper—Chloride of Salycile—Hydruret of Benzul—Aldehyd—Oil of Gualtheria—Cyanate of Potash—Cyanyde of Mercury—Sulphocyanide of Lead—Sulphuret of Cyanogen—Indigotin—Cinchonin—Oxalic Ether.

Mr. Dalpiaz, *Paris*, through Mr. John Savory.—Specimens of Chrome Alum—Crystallized oxide of Antimony—Artificial Camphor.

Mr. Dymond.—Specimens of Mineral Naphtha, from Rangoon—Mylabris Cichorii.

ON FREE TRADE AND RESTRICTIONS.

(*Extract from a Letter signed* "W. C.")

Desiring as I do most earnestly to witness the general adoption of sound "free trade" principles, I should regret that we should pursue any course inconsistent with those principles. Let us give no countenance to the insinuation that we advocate freedom of trade only when it tallies with our apparent interests; and let us also have a definite idea what we mean by the term. Free trade is a branch of civil liberty which has been defined as "the being restrained by no law, which does not conduce in a greater degree to the public benefit." It is freedom to the exercise of virtuous industry, not the permission to commit injuries and injustice, otherwise we must level all moral distinctions, and allow the sale of articles obtained by robbing and murder. Except in cases of emergency, no man can have *a right* to dispense remedies who has no knowledge of their nature and properties. The public health is endangered by such practices. The rights of the *qualified* pharmaceutists are invaded. If the pretender charge a mere modicum of profit on the compound, he deprives the latter of the fair remuneration for the labour and cost of becoming qualified. If he charge the full price, he charges for knowledge and skill which he does not possess. He is a swindler, obtaining money under false pretences.

On the other hand, it appears to me to be equally an invasion of the rights of industry to refuse this liberty of dispensing remedies to *any qualified* person. It would, I conceive, be inconsistent with the sound principles on which alone any restriction can be justified, to require apprenticeship and study in a particular place, and for a specified period. It would neither secure the public, nor raise the character of the profession. Many a candidate for *medical* practice has passed all these stages, been "ground up" for the examinations, and entering the ranks of the profession, has lowered its character by his incompetency. Let *qualification* alone then be the standard, not the mode by which it may be acquired; let it be tested by rigid examinations in all those branches of science and learning, a knowledge of which is essential to competence, and let every facility be furnished for the acquisition of this knowledge. No ground will then exist for a complaint that we exclude our countrymen from a means of subsistence: the appliances being placed within their reach, if they neglect to use them, they exclude themselves.

And as it is neither just nor consistent with the public interests that any class should possess the power by law arbitrarily to narrow its precincts for its own peculiar benefit; so neither would such a project answer the expectation of its originators. Evasions of every sort would be practised, and public opinion would obstruct the conviction and punishment of aggressors. We must be content then, in periods of general depression, to share with our fellow-countrymen acting only on the defensive against incompetence, quackery, and any arbitrary measures in the medical profession.

I think the Council of the Pharmaceutical Society deserves the thanks of the trade for the vigilance tempered by wisdom and moderation with which it has watched over its interests, and I regret that the narrow views or narrow circumstances of many of us should prevent them from seconding fully the measures so judiciously proposed for their improvement. I am sorry to observe the determination of the Editor of the *Pharmaceutical Journal*, or Committee, not to publish in the Journal the lectures on Practical Pharmacy*. This is precisely the branch of his profession in which the student can obtain little information from books, and where, consequently, he is almost entirely indebted to accidental advantages of position for any knowledge he may gain from the experience of others.

* As each lecture would occupy at least ten pages, the twenty-five lectures on Practical Pharmacy which are delivered during six months, would occupy not less than 250 pages. Six numbers of the Journal contain 288 pages. To condense into thirty-eight pages the remaining matter of six numbers, a more powerful hydraulic press than we possess would be required.

THE REDUCTION IN THE SUBSCRIPTION TO THE PHARMACEUTICAL SOCIETY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I am not going to trouble you with any lengthened remarks on the proposed alteration in the amount of the Annual Subscription to the Pharmacuetical Society; but will content myself with expressing my own opinion on that subject.

I think that to reduce the rate of subscription to the amount proposed, would, in many respects, be injurious to the *real* interests and prosperity of our excellent Society, and that it would be much crippled, both in its energies and objects, by so doing. It ought to be conducted on a scale becoming its growing importance, and in such a style of respectability as to impress the *public* mind in its favour, that they may thereby be led to place confidence *in*, and countenance *those*, who are accredited Members of the Pharmaceutical Society.

But if it be considered necessary to reduce the Annual Subscription to the amount proposed, I am decidedly of opinion that to the *Members* and *Associates* the reduced subscription ought to be exclusive of the Journal, and yet it *ought* to be binding on every Member and Associate to take the Journal at its published price*.

If the subscription is reduced, I think it is only fair and right that an entrance-fee be levied on future candidates.

I, for one, should like our Society to keep rising in importance and progressing in its movements, till we have the means and are able to establish a Pharmaceutical College, which shall be unrivalled (as you expressed it) by any in Europe. And why should we stop short until this exceedingly desirable object is attained?

I think too that no *expense* should be spared to make the School of Pharmacy—our lectures, and laboratory, as useful and subservient as possible to the interests of the Members of the Society, and I am persuaded it cannot be done if there be any material reduction in the Annual Subscription.

I remain, Sir, yours very respectfully,

George Whitton, *Secretary*.

Horncastle, Nov. 14, 1844.

* [This could not be done.—Ed.]

CHEMISTRY APPLIED TO ARTS AND MANUFACTURES.

Mode of Engraving upon, or ornamenting Steel and other Metals by means of Electricity.

BY MR. J. H. PRING.

The means which I propose, consist of an application of electricity, which I believe to be new, and shall be happy if they prove to be of practical utility.

The manner in which I have succeeded in producing marks or sketches upon plates of steel is as follows:—

I united six batteries of the kind invented by Mr. Smee, in each of which the size of the plate of platinized silver was about three square inches. I fixed the plate of steel to be engraved upon at the zinc end of the batteries. Having placed a wire of considerable length, covered with silk, between the plate of steel and the zinc, I took hold of the wire in communication with the platinized silver, and used it as an etching point upon the plate of steel. A bright electric spark, accompanied by a slight attack upon, or bite into the steel, was the result each time the wire came in contact with the plate.

The wire, which served as a graver, was made of platina; the part which I took hold of was enclosed in a glass tube, in order to facilitate its being taken hold of and moved more easily, and to protect the hand against the electric shocks to which it would be exposed without this precaution.

On using the wire in communication with the zinc, as an etching point, and attaching a plate of steel to the platinized silver, a totally different effect is produced. With the apparatus thus arranged, the spark resulting from the contact of the wire with the plate of steel is accompanied by the deposition of a very small portion of the wire itself upon the steel. By employing wires of different materials, such as gold, silver, platina, &c., a variety of ornamental designs may no doubt be produced upon surfaces of polished steel.

The effects of the electrical influence above described, are not confined to steel; a nearly similar result may be obtained by substituting plates of any other metal. It is to be presumed, that by augmenting the quantity and intensity of the electric currents, the effect upon the steel or other metal would be proportionably greater: and it is very probable, that by modifying the process, the application thereof might be advantageously extended.—*Bulletin de l'Industrie and Chemical Gazette.*

ON EAST INDIAN GRASS OIL.

BY T. STENHOUSE, PH. D.

I AM indebted to the kindness of Professor Christison for a quantity of an East Indian grass oil, which forms the subject of the present notice. This oil is said to be the produce of *Andropogon Ivaracusa*, and is, I believe, what is commonly called the oil of Namur, though Dr. Royle affirms that the grass oil of Namur is derived from the Andropogon (*Calamas Aromaticus*), the true spikenard of the ancients.

The oil which I have subjected to examination has a very fragrant aromatic odour, slightly resembling that of otto of roses, but not nearly so rich. Its taste is sharp and agreeable, approaching that of oil of lemons. It has a deep yellow colour, and evidently contains a good deal of resinous matter, which induces me to suspect that it is pretty old. It is lighter than water, and quite neutral to test paper.

When mixed with water, and subjected to distillation, it left nearly one-half of its bulk of a fluid resin. The oil which passed into the receiver was colourless, but its smell was not quite so agreeable as before distillation, and the same was the case with the resin in the retort. The oil was rendered anhydrous by treating it with chloride of calcium and again rectifying it.

It began to boil at 297° Fahr., but the boiling gradually rose to 320° Fahr., when it became stationary for some time, and then continued rising. When subjected to analysis,

0.3465 gr. gave 1.061 of carbonic acid and 0.3575 water.

Carbon	83.76
Hydrogen	11.46
Oxygen	4.78
	100.00

As the analysis evidently showed that the oil consisted of a carburetted hydrogen mixed with a little of an oxygenated oil, a quantity of the rectified oil was treated with small pieces of sodium. These immediately caused an evolution of hydrogen, but this ceased in a short time, and the bits of sodium which had not dissolved remained quite bright, while a small quantity of a reddish coloured resin was also formed. The oil was then poured off the sodium and rectified. When subjected to analysis,

0.2675 gram. gave 0.855 of carbonic acid and 0.277 water.

		At.	Calculated numbers.
Carbon	88.37	5 Carbon	= 88.46
Hydrogen	11.50	4 Hydrogen	= 11.54
	99.87		100.00

The grass oil consists, therefore, of a carburetted hydrogen, having the same composition, $C_5 H_4$, as the numerous other oils of which oil of turpentine is the type, together with a small quantity of one or more oxygenerated oils. The affinity which this grass oil has for oxygen appears to be very considerable; for even after being purified, the carburetted hydrogen part of the oil cannot be distilled without a little of it being converted into a resin. The resinous matter, of which the oil contains such a large quantity, is, I should think, therefore most probably the effect of oxidation.—*Proceedings of the Chemical Society.*

ON THE ANALYSIS OF GUANO.

BY ANDREW URE, M.D., F.R.S., &c.

(*Continued from page* 227.)

Oellacher could find no evidence of urea in his guano; I have obtained fully five per cent. of this substance from good Peruvian guano.

I shall now describe my own system of analysis:—

1. In every case I determine, first of all, the specific gravity of the guano; which I take by means of spirits of turpentine, with a peculiar instrument contrived to render the process easy and precise. If it exceed 1.75 in density, water being 1.0, it must contain sandy impurities, or has an excess of earthy phosphates, and a defect of azotized animal matter.

2. I triturate and digest 200 grains of it with distilled water, filter, dry the insoluble matter, and weigh it.

3. The above solution, diffused in 2000 grain-measures, is examined as to its specific gravity, and then with test-paper, to see whether it be acid or alkaline.

4. One-half of this solution is distilled along with slaked lime in a matrass connected with a small quintuple globe condenser, containing distilled water; and immersed in a basin of the same. As the condensing apparatus terminates in a water-trap, no part of the ammonia can be lost; and it is all afterwards estimated by a peculiar meter, whose indications make manifest one hundredth part of a grain.

5. The other half of the solution is mixed with some nitric acid, and divided into three equal portions.

a. The first portion is treated with nitrate of barytes, and the resulting sulphate of barytes is collected, ignited, and weighed.

b. The second portion is treated with nitrate of silver, and the resulting chloride of silver ignited and weighed.

c. The third portion has a certain measure of a definite solution of ferric nitrate mixed with it, and then ammonia in excess. From the weight of the precipitated subphosphate of iron after ignition, the known amount of oxide used being deducted, the quantity of phosphoric acid in the soluble portion of the guano becomes known.

d. The three above portions are now mixed, freed by a few drops of dilute sulphuric and hydrochloric acids from any barytes and silver left in them, and then tested by nitrate of lime for oxalate of ammonia. The quantity of oxalate of lime obtained determines that point.

6. The last liquor filtered, being freed from any residuary particles of lime by oxalate of ammonia, is evaporated to dryness and ignited, to obtain the fixed alkaline matter. This, being weighed, is then dissolved in a little water, neutralized with acid, and treated with soda-chloride of platinum. From the quantity of potash-chloride of platinum which precipitates, after being

filtered, dried, and weighed, the amount of potash present is deducted; the rest is soda. These bases may be assigned to the sulphuric, hydrochloric, and phosphoric acids, in proportions corresponding to their respective affinities.

7. The proportion of organic matter in the above *solution* of guano is determined directly by evaporating a certain portion of it to dryness, and igniting. The loss of weight, minus the ammonia and oxalic acid, represents the amount of organic matter.

8. A second portion of a solution of the guano is evaporated to dryness by a gentle steam-heat, weighed, enclosed in a stout well-closed phial along with alcohol of 0.825, and heated to 212°. After cooling, the alcoholic solution is decanted or filtered clear, evaporated to dryness by a gentle heat, and weighed. This is urea, which may be tested by its conversion into carbonate of ammonia, when heated in a test-tube or small retort. In this way I have obtained from Bolivian guano five per cent. of urea: a certain proof of its entire soundness.

9. *Analysis of the insoluble matter.*—One-third of it is digested with heat in abundance of borax-water, containing $\frac{1}{100}$th of the salt, filtered, and the filter dried by a steam-heat. The loss of weight indicates the amount of uric acid, which is verified by supersaturating the filtrate with acetic or hydrochloric acid; thus precipitating the uric acid, throwing it upon a filter, drying, and weighing it. This weight should nearly agree with the above loss of weight, the small difference being due to soluble organic matter, sometimes called geine and ulmic acid. The uric acid is evidenced, 1st, by its specific gravity, which I find to be only 1.25, as also that of the urate of ammonia; 2d, by its affording fine purple *murexide* when heated in a capsule along with nitric acid, and then exposed to the vapour of ammonia from a feather held over it; 3d, by its dissipation when heated, without emitting an empyreumatic odour.

10. Another third of the solid matter is distilled along with half its weight of slaked lime and ten times its weight of water, in the apparatus already described, and the ammonia obtained from it estimated.

11. The remaining third having been ignited, is dissolved with a gentle heat in weak hydrochloric acid, and the remaining silica and alumina washed on a filter, dried, and weighed. To the hydrochloric solution dilute sulphuric acid is added, and the mixture is heated till all the hydrochloric acid be expelled, and the greater part of the water. Alcohol of 0.850 is now poured upon the pasty residuum, and the whole, after being well stirred, is thrown upon a filter. The phosphoric acid passes through, as also the magnesia in union with sulphuric acid. The sulphate of lime, which is quite insoluble in spirits of wine, being washed with them, is dried, ignited, and weighed. From the weight of sulphate of lime, the quantity of phosphate of that earth that was present becomes known.

12. Ammonia in excess is now added to the filtrate, which throws down the granular phosphate of ammonia and magnesia. After washing and drying this powder, at a heat of 150°, its weight denotes the quantity of that compound in the guano.

13. To the filtered liquor (of 12), if a little ammonia be added, and then muriate of magnesia be slowly dropped in, phosphate of ammonia and magnesia will precipitate, from the amount of which the quantity of phosphoric acid may be estimated.

14. The proportion of oxalate of lime is determined by igniting the washed residuum (of 9), and placing it in an apparatus for estimating the quantity of carbonic acid given off in dissolving carbonate of lime. The apparatus, either fig. 1 or 2, described in my little treatise on alkalimetry, will serve that purpose well. I have rarely obtained more than half a grain of carbonic acid from the insoluble residuum of 100 grains of good guano; and that corresponds with less than one and a half per cent. of oxalate of lime in the guano. Sometimes no effervescence at all is to be perceived in treating the washed residuum with acid after its ignition.

15. The carbonate of ammonia in guano is readily determined by filtering the solution of it in cold water, and neutralizing the ammonia with a test or alkalimetrical acid. (See the Treatise on the Alkalimeter above referred to.)

16. Besides the above series of operations, the following researches must be made to complete our knowledge of guano. The insoluble residuum (of 10) which has been deprived by two successive operations of its uric acid and ammonia, may contain azotized organic matter. It is to be, therefore, well dried, mixed with five times its weight of the usual mixture of hydrate of soda and quicklime, and subjected to gentle ignition in a glass or iron tube closed at one end, and connected at the other with an ammonia-condensing apparatus. The amount of ammonia being estimated by a proper ammonia meter, represents the quantity of azote, allowing 14 of this element for 17 of ammonia, being the potential ammonia corresponding with the undefined animal matter. In a sample of Peruvian guano I obtained five per cent. of ammonia from this source.

17. The whole quantity of ammonia producible from guano is to be determined by gently igniting 25 grains of it, previously well dried, and then mixed with ten times its weight of the mixture of hydrate of soda and quicklime (two parts of the latter to one of the former). The ammonia disengaged is condensed and measured as above described.

18. The ready-formed ammonia is in all cases determined by distilling a mixture of 100 grains of it with 50 grains of slaked quicklime, condensing the disengaged ammonia, and estimating it exactly by the meter.

19. The relation of the combustible and volatile to the incombustible and fixed constituents of guano, is determined by igniting 100 grains of it in a poised platinum capsule. The loss of weight denotes the amount of combustible and volatile matter, including the moisture, which is known from a previous experiment.

20. The insoluble matter is digested in hot water, thrown upon a filter, dried, and weighed. The loss of weight is due to the fixed alkaline salts, which, after concentrating their solutions, are to be investigated by appropriate tests:—1st, nitrate of barytes for the sulphates; 2d, nitrate of silver for the chlorides and phosphates; and, 3d, soda—chloride of platinum, for distinguishing the potash from the soda salts.

21. The insoluble matter (of 20) is digested with heat, in dilute nitric or hydrochloric acid, and the whole thrown upon a filter. The silica which remains on the filter is washed, ignited, and weighed. The lime, magnesia, and phosphoric acid, which pass through in solution, may be determined as already pointed out.

22. I have endeavoured to ascertain if muriate of ammonia be present in guano, by evaporating its watery solution to dryness, and subliming the residuum; but I have never obtained a satisfactory portion of sal ammoniac, and therefore I am inclined to think there is little of it. The quantity of chlorine to be obtained from guano is too inconsiderable to lead to a suspicion of its presence, except in combination with sodium and potassium. Phosphate of soda is also a doubtful product; but if present, it may be obtained from the saline matter (of 20), by acidulating it with nitric acid; precipitating first with nitrate of barytes, next with nitrate of silver, taking care to use no excess of these two reagents; then supersaturating the residuum with ammonia, and adding acetate of magnesia, when the characteristic double phosphate of this earth should fall, in case phosphate of soda be present.

By the preceding train of researches, all the constituents of this complex product may be exactly disentangled and estimated; but they manifestly require much care, patience, time, and dexterity, as also a delicate balance, particularly in using the appropriate apparatus for generating the potential ammonia, and for measuring the whole of this volatile substance, separated in the several steps of the process. It may be easily imagined how little confidence can be reposed in many of the analyses of guano, framed, I fear, too

often with the view of promoting the sale of an indifferent or even a spurious article of commerce.

A.—I shall now give in detail my analytical results upon three different samples of good South American guano; and next, the general results upon three samples of African and Chilian guanos:—

1. Guano, from Bolivia imported by the *Mary and Anne*. This sample was taken by myself as an average of several bags in the lighter, before the cargo was landed. Pale yellow colour, dry, partly pulverulent, partly concreted in small lumps, with a few small fragments of granite, which being obvious, were separated prior to the analysis. Specific gravity of the pulverulent portion without granite, 1.60; of the concretions, 1.66; mean, 1.63. Water digested on the former portion is neutral to litmus paper; on the latter it is faintly acid.

2. 100 parts lose 6.5 by the heat of boiling water, and exhale no ammonia. When digested and triturated with cold water, 30.5 parts dissolve, and 69.5 are obtained after drying at 212°. Of those 30.5 parts, 6.5 are, therefore, water, easily separable, and 24.5 parts are solid matter.

3. 100 parts, mixed with nine times their weight of water, and fifty of lime, being distilled in an alembic connected with the five-globe condenser, &c., afforded exactly 4.2 of ammonia. 20 grains in fine powder, along with 200 of a mixture, consisting of two parts of dry lime and one of hydrate of soda were gently ignited in a combustion-tube connected with the ammonia-condensing apparatus, and they produced 4.25 grains of ammonia—equivalent to 21.25 from 100 grains of the guano. Thus only 4.2 per cent. of ammonia were ready formed; while 17.05 lurked, so to speak, in their azotized elements. From its aspect and its want of ammoniacal odour, this guano, the first cargo received from Bolivia, was imagined by its importers to be of bad quality; and accordingly my very favourable report of its analysis surprised them not a little, and rather unsettled the little faith they had at that time (January, 1843) had in Chemistry. But about a fortnight after the date of my report, they received a letter from Peru apprising them of the excellence of that cargo of Bolivian guano, and of its being prized by the Americans as possessing fertilizing powers in a pre-eminent degree. I consider this guano, therefore, as a type of the substance in its best state.

II. The soluble matter was analyzed, in the manner already detailed, and was found to consist of,

1. Urea	5.
2. Sulphate of potash	7.90
3. Chloride of sodium	5.
4. Biphosphate of ammonia	5.50
5. Oxalate of ammonia	0.60
	24.

In these ammoniacal salts there are only 1.65 parts of ammonia; but I obtained 2.55 grains in distilling the soluble matter of 100 grains of the guano. The remaining 0.9 parts, therefore, must have proceeded from the partial decomposition of the urea during the long ebullition necessary to extract every particle of ammonia in distilling the guano along with quicklime.

III. The *insoluble* matter = 69.5 parts, was found to consist of—

1. Silica	2.25
2. Subphosphate of lime	9.00
3. Phosphate of magnesia and ammonia	1.25
4. Urate of ammonia	15.27
5. Undefined azotized organic matter, affording, with the 14 parts of uric acid, by ignition with hydrate of soda, 17.05 parts of ammonia	41.73
	69.50

This result as to the large proportion of organic matter in the dried insoluble residuum was verified by igniting a given quantity of it, when it was found to lose, out of 69.5 parts, 57 ; corresponding to the 15.27 urate of ammonia, 41.73 of undefined matter, and 0.08 of ammonia, in the double magnesian phosphate. In the urate and double phosphate are 1.35 of ammonia, which, with the 2.55, make 3.9 parts; the other 0.3 parts may be traced to the urea.

As these results differ very considerably in many respects from those of the analyses made by respectable German Chemists, I was careful to verify them by manifold variations of the process.

1. The soluble matter, with acid reaction, of 100 parts of the lumps of the Bolivian guano, was examined by per-acetate of iron and ammonia, for phosphoric acid, and afforded four parts of it, which is more than had been found in the neutral pulverulent guano. After the phosphoric acid was separated by that method, chloride of calcium gave no cloud with the filtered liquor, proving that no oxalic acid was present in these nodules. The washed insoluble matter, when gently ignited, and treated with dilute nitric acid, afforded no effervescence whatever; and, therefore, showed that no oxalate of lime had been present, for it would have become a carbonate.

It is necessary to determine from time to time the quantity of ferric oxide in the acetate or nitrate, as it is liable to be deposited from the solution, when this is kept for some time. If this point be not attended to, serious errors would be committed in the estimation of the phosphoric acid.

2. The quantity of uric acid was verified by several repetitions, and found to be 14 per cent.

3. The undefined organic matter, when deprived of the uric acid by prolonged digestion with weak borax water, being subjected to ignition along with hydrate of soda, yielded the quantity of ammonia requisite to constitute the whole sum, that producible from the uric acid alone being taken into account.

4. The little lumps of the guano afforded by distillation along with quicklime, 5.27 per cent. of ready-formed ammonia, probably from the uric acid being partially decomposed by the moisture which had concreted them. It is a curious fact that the solution of borax, from being of an alkaline, becomes of an acid reaction, after digestion with the Bolivian guano.

(To be continued.)

REMARKS ON THE BEBEARU (OR GREENHEART) TREE OF BRITISH GUIANA.

BY H. RODIE.

Class and Order...Dodecandria Monogynia.
Natural Order.....Lauraceæ.

Leaves opposite, oblong, acute, entire, shining, undulated, about five inches long, with reverted margins, on short petioles.

Inflorescence a cyme, generally axillary, appears at the equinoxes, each flower about two lines diameter, on short peduncles, internally snow white, and thickly studded with minute glands ; has a strong jessamin odour. Specific character and synonyms not ascertained.

This tree is found in the greatest perfection immediately behind the alluvial soil of the coast and rivers, on clay hills but little elevated above the level of the ocean, and degenerates as it extends into the interior, till on the more elevated region of the Cinchonas it disappears. Seems almost peculiar to British Guiana.

The tree generally stands single and rises on an erect, cylindrical, gently tapering stem to a height of eighty or ninety feet, to forty or fifty without a branch, by a circumference of nine or even twelve feet.

It is recognised at a distance by its dense glossy foliage, and comparatively

white trunk. On striking it with the edge of the cutlass, the bark flies like sandstone, and is very bitter.

The wood is extremely strong, hard, and heavy, sinking in water, and taking a high polish. Neither the white ants on land, nor the teredo in the water, affect it much; it has stood on wharves totally unprotected for sometimes thirty years in the tides-way. Its various shades of colour, from black to yellow, cannot be ascertained until the sapwood be cut through, which is invariably of a pale yellow, no difference in their botanical character or medical virtue has been observed. It appears to be of slow growth, for from the detritus accumulated round the old trees, and from the young trees in the formerly exhausted ground having in, say seventy years, scarcely attained the size of a spar (eight inches diameter), it is supposed several hundred years would be required for its growth.

Almost every tree above eight inches in diameter has a quantity of obovate compressed nuts laying around its root, about the size of an apple, enveloped in a grayish brown brittle shell, one line and a half thick; that parts readily from a kernel, which is yellowish when cut, but immediately becomes dark brown on exposure to the air, and is intensely bitter, or, in other words, rich in Bebearine: productiveness greater than either bebearu or yellow cinchona bark; and its tincture, which is by reflection light dark olive green, does not affect the test-paper as the infusion of these barks does.

The bark is hard, heavy, and brittle, fracture short like sandstone, covered externally with a white exfoliating epidermis, and is of a bright cinnamon colour within: it adheres firmly to the tree even when full of sap,* requiring to be gently beaten so as to crush the liber or inner rind, when it can be parted in flat pieces, of six to twelve inches square, and from one-eighth to one-fourth of an inch thick, and is very bitter.

On subjecting it to the process by which quinine is usually made, two alkaloids are obtained, and the term *bebearine* has been applied to them collectively. One of these only, when combined with slight excess of sulphuric acid, and the solution reduced to the consistence of syrup, *appeared* to form small acicular crystals, which could not be separated from the mass.

Its infusion, like that of the cinchonas, reddens litmus paper, is clearer though darker-coloured than the latter, and deposits much less sediment on standing. Its productiveness, compared to that of yellow cinchonas, appears to be nearly as three and a half to five.

When long subjected to a boiling temperature (212° F.), or long contact with alkaline or caustic earthy substances, its bitter is destroyed.

Its exhibiting phenomena so similar to those of the cinchonas, when subjected to the same chemical reagents, as to leave us no discriminative test, seems to corroborate the fact, that it is another variety of the febrifuge principle, of virtues not yet sufficiently ascertained, but perfectly innocuous.†

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* No monthly rise and fall of the sap has ever been observed in tropical forests by the writer, as is vulgarly believed, though he has resided within such forests the one-fourth of a century. The return of a vertical sun, or the rains, alone influence the vegetable kingdom.

† The Indians, when their provisions fail, have from time immemorial used this nut as food (bread). They first break and part the shell from the kernel, which they then scrape and grate as they do cassava, throw the pulp into an open basket placed over a pail, and pour water over it so as to wash away the bitter, and this is repeated five times or oftener.

It is then *invariably* mixed with about one-third part its bulk of decayed wallaba, pounded to powder and sifted; or a like quantity of cassada pap put into the matappe or press, and the farinaceous substance thus expressed, baked into bread.

My informant, who was *perfectly* acquainted with the process, could not

Bebearine, when properly administered, generally cures intermittents when quinine has failed, seems not to affect the head, nor to produce its effects by counter morbid action, as the alkaloids of the cinchonas are supposed to do.

It will occur to the physician that in tropical fevers, where symptoms indicate its exhibition, if the stomach be charged with viscid matter, the solid form of this resinous-like substance would hardly be soluble ; or were its contents of an alkaline nature, affecting the test-paper, it would, without acids (with all which it appears to be compatible), as surely fail as if seltzer water, tea, or other incompatible substances were used during its administration ; and the remission that frequently occurs once, and frequently no more, in such fevers, would be lost.—*Royal Gazette of Georgetown, British Guiana.*

PREPARATIONS OF ANIMAL BODIES.

From the Proceedings of the British Association—Zoology and Botany.

Mr. GOADBY exhibited a series of preparations of animal bodies preserved in glass cases, according to a method of his own suggestion. Many gentlemen having complained that they had not succeeded in preparing animal substances in the way which he recommended, he was desirous of stating fully the plans which he pursued. The following were the formulæ for all the solutions he used :—

A 1.

Bay salt	4 ozs.
Alum	2 ozs.
Corrosive sublimate	2 grains.
Water	1 quart.

A 2.

Bay salt	4 ozs.
Alum	2 ozs.
Corrosive sublimate	4 grains.
Water	2 quarts.

B.

Bay salt	½ lb.
Corrosive sublimate	2 grains.
Water	1 quart.

B B.

Bay salt	½ lb.
Arsenious acid (or white oxide of arsenic)	20 grains.
Boiling water	1 quart.

C.

Bay salt	½ lb.
Arsenious acid	20 grains.
Corrosive sublimate	2 grains.
Boiling water	1 quart.

The first, A 1, was the ordinary solution he used. A 2, where there was a tendency to mouldiness, and the animal texture was tender, as

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say from what reason the decayed wallaba was added : whether to increase the bulk to give it the necessary consistence to make bread, or to correct the taste, which is still somewhat bitter ; but supposed the latter. Recent wallaba (a colony weed) is rich in tannin, which precipitates and renders tasteless bebearine.

although salt preserved animal matters, it sometimes destroyed the tissue. B was used in cases where animals contained carbonate of lime, as in these cases, alum produced decomposition. For old preparations, arsenic was substituted for corrosive sublimate, as in B B, but where there was a tendency to too much softening, the corrosive sublimate should be added, as in C.

Professor Owen stated, that these solutions were better than alcohol for the preservation of nervous matter. In the course of his remarks he called attention to the dissections of the invertebrate animals made by Mr. Goadby, many of which are at present in the museum of the College of Surgeons.—*Athenæum.*

ON TWO NEW SPECIES OF THE FAMILY LAURINEÆ.

BY MR. SCHOMBURGK.

(*From the Proceedings of the British Association—Zoology and Botany.*)

The first is a tree which affords timber which is brought to England, and known by the name of *Greenheart.* This tree was found by Dr. Rodie to possess febrifugal properties, and Dr. Maclagan has published an account of two new alkaloids which he had obtained from it by chemical processes. These alkaloids may be used instead of quinine. The second tree has long been known, and yields an aromatic fruit, known by the name of the *Accawai nutmeg,* and is extensively used in Guiana as a remedy in diarrhœa, dysentery, and other intestinal diseases. The author succeeded in obtaining flowers and seeds, and had found this tree to be a species of *Acrodiclidium,* to which he has given the specific name *Camara.* It appears to be restricted to the sandstone mountains of Roraima, between the fifth and sixth parallel of north latitude.

Professor Balfour stated, that the *Greenheart* was much used for building vessels on the Clyde. The alkaloid obtained from this tree was called by Dr. Maclagan bibirine, but its insolubility rendered it unfit for medical uses. Professer Tilley stated, that although Dr. Maclagan had named two alkaloids as being present in the wood of the *Greenheart,* subsequent experiments had led him to conclude, that there was but one, and this he called bibirine. This alkaloid presented a similar chemical constitution to quinine. It was not, however, combined with an organic acid.—*Athenæum.*

ON THE TWO VARIETIES OF JALAP IN COMMERCE.

BY DR. G. A. KAYSER, IN HERMANNSTADT.

Two sorts of jalap-root occur in commerce. The one which was first introduced into the market, and which is even at the present day most frequently met with is the *radix jalapæ tuberosæ* seu *ponderosæ,* and is obtained from the *Ipomœa Schiedeana* of Zuccarini, a plant growing in the neighbourhood of Chiquonquiaco, on the eastern declivity of the Mexican Andes, and discovered by Von Schiede: the root, as met with in commerce, consists of pieces varying from the size of a nut to that of the fist, sometimes whole, sometimes cut into disks, and at other times divided into two or three portions. The external surface is of a more or less dark grey brown colour, corrugated and rough. It is very hard, presents a shining resinous even surface when broken, and is difficult to reduce to powder. The powder is of a brownish colour, has a faint, peculiar odour, and irritant taste.

The second variety which was introduced into commerce in great quantities a few years ago, by the name of *stalk-jalap, stipites jalapæ,* and is now more scarce, is the *radix jalapæ lævis* seu *fusiformis;* and obtained from the *Ipomœa orizabensis* of Pelletan, a plant growing without cultivation in the

neighbourhood of the Mexican town of Orizabu, and first made known by Ledanois, an apothecary in Mexico. The root as met with in commerce, consists of pieces varying from one to three inches in length, and one and a half to two inches in diameter; they are of a lighter colour than the pieces of the jalapa tuberosa, and of decidedly fibrous structure. Taste and odour are the same as those of the former variety, but not so powerful.

Various botanists have given the following names to the *Ipomæa Schiedeana* of Zuccarini: *Convolvulus purga* seu *purga de jalappa* of Schiede; *Convolvolus purga*, Wenderoth; *Ipomæa purga*, Hayne; *Convolvulus officinalis* of Pelletan; the *Convolvulus jalapa* of Linnæus, belongs to the genus *Batatas*, which contains no purgative resin.

The chief constituent of both varieties of jalap is a peculiar resin, of which they contain about 10 per cent. I have made use of the term "*radix jalapæ*," because it is in general use, although morphologically incorrect, for the term *tuber-stock* (knollenstock), or "*cormus*" should be substituted.

The jalap resin of commerce was formerly only obtained from the cormus of the *Ipomæa Schiedana*, and the formula for the preparation of it adopted in all Pharmacopœias, that prescribe the use of this root. But since the introduction of the *radix jalapæ fusiformis*, resin obtained from the latter has been met with in commerce, either pure or mixed with the former resin; for both roots are frequently found mixed in trade.—*Annalen der Chemie und Pharmacie.* Band xli, Heft 1.

NEW REMEDIES FOR GOUT.

Extracted from a paper in the Medical Gazette of November 8, entitled "Researches on Gout."

BY ALEXANDER URE,

Fellow of the Royal College of Surgeons of England, Surgeon to the Westminster General Dispensary, and Hon. Member of the Pharmaceutical Society.

Manganese, in the state of proto-carbonate, is present in the waters of Marienbad, Carlsbad, and other German springs, whither gouty invalids annually resort in quest of health; in the state of oxide, it forms one of the normal constituents of the bones. It was first shown by M. C. G. Gmelin, of Tubingen (*Versuche über die Wirkungen des Baryts, &c.*, 1824, p. 96), that the manganese salts when injected into the blood-vessels augmented the biliary secretion to such a degree, as to produce a deep yellow staining of the coats of the intestines, and of the great vessels in the vicinity. According to M. A. Barbet (*Journal de Chimie Médicale*, tome v., p. 534), muriate of manganese forms a main ingredient of a nostrum sold in Paris, under the name of the deobstruent powder of Rouvière. This, taken for a few days, is said to procure abundant bilious evacuations.

If a drachm of sulphate of manganese be dissolved in about half a pint of water, and swallowed before breakfast, it will generally occasion after the lapse of an hour or so, one or more liquid stools.

Sulphate of manganese has a cooling and bitter taste, resembling that of Glauber salt. Dr. Thomson (*Chemistry of Inorganic Bodies*, vol. ii., p. 587) says, "It may be administered as a cathartic, in doses of from half an ounce to an ounce." I have always found a much smaller quantity suffice, and should be reluctant to give it to that extent. It acts most efficiently when dissolved in a considerable quantity of water. On particular occasions, infusion of senna furnishes a useful adjunct.

In order to abate the erethism of the vessels of the gouty articulation, to further the absorption of effused fluids, and to arrest the recurrence of attacks which, in the long run, lead to distortion and ankylosis, the topical employment of Acetic Ether and Rectified Coal Naphtha will be found highly

serviceable. The former was first introduced to the notice of the profession by M. Sedillot, in the *Transactions of the Medical Society of Paris* (No. x., Mess. An. 5), but never seems to have attracted attention here. Acetic ether generally determines a speedy sedative agency in the more acute stage of the malady, when applied with gentle friction over the whole of the affected surface, to the amount of half an ounce every twelve hours, provided after each friction the patient is kept warm in bed. In the sub-acute form of the disease, I have witnessed very beneficial effects from simply pencilling over the part with a camel-hair brush dipped in naphtha*. In some instances, indeed, this seemed to have the power of warding off an impending paroxysm. I was first led to try it in gouty cases, from being told by an extensive manufacturer of the article near Birmingham, that affections of the joints were unknown among his workmen, while they were common enough among the operatives of other factories in the neighbourhood.

Coal naphtha is a pure hydro-carbon, almost identical in nature and properties with the naphtha which occurs native on the shores of the Caspian sea, in Persia, and other countries of Asia. The latter, alluded to by Herodotus, has been used from a remote period by some of the nations of the east, against the very ailment in question. Thus, Dioscorides (Lib. i. c. 85) says, "Podagris articulorum doloribus lethargisque prodest;" and Bontius (*Hist. Nat.* p. 17), in describing what he calls "a noble species of naphtha" brought from Sumatra, and highly prized for its medicinal virtues by the Javanese, concludes as follows: "Partibus affectis illitum miraculi instar ægros consolatur."

Naphtha topically applied imparts a feeling of warmth, sometimes accompanied with slight tingling. It acts obviously upon the principle of a mild but penetrating counter-stimulant, determining contraction of the capillaries, increase in the rapidity of their circulation, and progressive absorption of liquid effusion.

As a remedial agent, seemingly endowed with qualities capable of counteracting and removing tophaceous deposition, Silicate of Potash, the *liquor of flints* of the older chemists, deserves a trial. This salt passes through the system unchanged, and can be detected in the urine of animals to which it has been given by the mouth. It exercises a very powerful solvent action upon the urate of soda. I have prescribed it for one or two patients in doses of ten and fifteen grains twice a day, dissolved in six or eight ounces of water, with apparent benefit.

OBSERVATIONS ON THE PHARMACEUTICAL AND CHEMICAL CHARACTERS OF THE PERUVIAN MATICO.

BY JOHN F. HODGES, M.D.

About five years ago, I received a parcel of the leaves of the Matico from a friend who had resided many years in Peru. He informed me that they were universally regarded by the native practitioners of that country as a most valuable remedy in various diseases, and also related several marvellous stories, current among the Indians and European settlers, of their power in arresting the most violent hæmorrhages, particularly those connected with the bladder and urinary organs. At the time I made a few experiments with the leaves, which, however, I was only lately able to pursue, and as they have not been subjected, so far as I can in this remote district ascertain, to a careful chemical examination either in this country or on the continent, the following observations may be interesting:—It is, I

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* Care must be had not to confound this with a spirit sold under the same name, used for making hatters' varnish, and lately introduced as a medicine. The properties of the two are quite dissimilar.

believe, to Dr. Jeffreys, of Liverpool, that we are indebted for the first notice in this country of the medicinal virtues of the Matico. Its action, when applied externally as a styptic, has been established in the practice of Dr. Munro, of Dundee; and Dr. Lane, of Lancaster, has also lately communicated the results of his experience regarding its internal administration, which are confirmatory of its South American reputation. On the continent, a short notice of it has appeared in the *Pharmaceutische Central Blatt*, January 1843, by Dr. Martius; and a brief and imperfect account of it is also given in the *Dictionnaire* of Mérat and Lenz. It is stated by Dr. Martius that, like the Gunjah, which the East Indian prepares from the *Cannabis Indica*, the leaves and flowers of the Matico have been long employed by the sensual Indians of the interior of Peru to prepare a drink which they administer to produce a state of aphrodisia.

The sample of Matico which I received consisted of the leaves of the plant, which were of various sizes, from two to eight inches long, and appeared to have been dried, as they could easily be rubbed to powder between the hands. It is, indeed, stated by Dr. Martius, that the Indians dry the leaves over a fire, taking care not to allow them to be touched by the flame or burnt. Another sample which I lately procured had the same appearance, but contained, mixed up with the leaves, a considerable quantity of the flowering twigs and woody stems of the plant. The leaves and twigs were compressed together and flattened into a cake.

The botanical history of the Matico appears to be but imperfectly known; and there exists a difference of opinion even as to the class of plants from which it is derived; Dr. Martius, in the *Phar. Central Blatt*, considering it to belong to the *Phlomis* tribe, while in the *Flora Peruviana* it is described as a *Piper*. By immersing a specimen of the plant, which seemed tolerably perfect, in warm water, I was able to examine it with considerable accuracy, and certainly its characters appear very unlike those which belong to the Phlomis family. The stems are woody, round and pubescent; the leaves sessile, acuminato-lanceolate, rugose, and crenate, their upper surface of a dark green, and their lower of a pale green colour. It is said that the name of the plant is derived from a Spanish soldier, named Matico, who, lying desperately wounded and bleeding to death, in his agony caught accidentally some of its leaves, and by their application arrested the hæmorrhage and healed the wound. The leaves have a strong aromatic, slightly astringent taste, and the smell and taste of their infusion in water very much resembles that of the tea prepared by the country people in Ireland from the leaves of our indigenous *Salvia verbenaca*.

The following experiments were undertaken to ascertain the pharmaceutical characters of the leaves:—

Experiment 1.—Reduced half an ounce of the leaves to a coarse powder and macerated in six fluid ounces of cold distilled water. In ten minutes the liquid had a pale amber colour and the specific gravity 1.003; in thirty minutes its density had increased to 1.004 and its colour had become of a deeper amber; it possessed the peculiar aromatic astringent taste of the leaves. In two hours the liquid had specific gravity 1.005, gave a deep olive precipitate with tinct. ferri muriat., and a yellow white with acetate of lead; tartrate of antimony produced no change. In three hours its colour was rather more brown, specific gravity 1.005. In five hours specific gravity 1.005½; when dropped into a solution of gelatine it produced no change. In seven hours specific gravity had not increased. In nine hours no change. The maceration having been continued for twelve hours longer, the density was not increased. The filtered liquid had a rich orange-brown colour, was neutral to litmus, and possessed the smell and taste of the leaves. The following reagents were applied (solution of gelatine, tartar-emetic, and perchloride of mercury produced no change):—

Tinct. ferri muriat.	Deep black colouring and dark olive precipitate.
Acetate of lead ...	Copious canary yellow precipitates.
Infusion of nutgalls	
Sulphuric acid	Brown-yellow precipitates.
Nitric acid.....	
Muriatic acid	

Caustic potash deepened its colour without throwing down a precipitate. Returned the liquid to the leaves and added six ounces of cold distilled water, which redueed its specific gravity to 1.003. In three hours its density had not increased; poured off the liquid without expression, and macerated the same leaves in six ounces of cold water. In three hours the liquid had a light yellow colour and specific gravity 1.002 ; gave a very minute deposit with acetate of lead. Poured off the liquid and macerated for fourteen hours in the same quantity of water ; specific gravity 1.000.

Experiment 2.—Infused half an ounce of the sub-pulverized leaves in six ounces boiling water. In three hours the liquid had the same taste and colour, and exhibited the same reactions as the cold infusion ; specific gravity 1.006.

Experiment 3.—Exhausted one ounce-and-a-half of the leaves by boiling with distilled water over a water-bath and evaporating the filtered decoction to the consistence of an extract. The quantity of extract procured weighed 120 grains. It had a dark brown colour and bitter astringent taste, and possessed very little of the aromatic qualities of the leaves.

Experiment 4.—Introduced three ounces of the Matico leaves, on a perforated metal support. into a tin plate still with about two quarts of water, and heated over the fire of a table furnace, adding fresh water occasionally to supply the loss. A milky liquid was given off possessing a strong aromatic camphoric odour, and tasting something like a mixture of oil of rosemary and oil of cubebs. It contained a considerable quantity of heavy oil of a light green colour, which slowly subsided to the bottom of the recipient. By returning the milky liquid to the still, and distilling again with two ounces of fresh leaves, a liquid was procured from which about one drachm of this oil subsided.

The *Oil of Matico* has a light green colour ; when recent it has nearly the consistence of good castor oil, but becomes thick and crystalline on keeping. Its smell is very powerful and permanent, and its strong camphoric taste remains a considerable time in the mouth. It dissolves readily in ether and in alcohol ; the solutions are colourless. Sulphuric acid also dissolves it, with the production of a beautiful carmine colour ; water added to this solution destroys its colour, and converts it into a milky liquid. Nitric acid when poured on the oil becomes of a deep amber colour, and converts it into a resinous matter. Neither caustic potash nor ammonia had any action on it. After all the oil had been separated by distillation, a deep rich red-brown liquid remained in the still ; it had a bitter astringent taste, without any of the aromatic flavour of the leaves ; it was neutral to litmus ; the leaves were quite insipid. The filtered liquid acted towards reagents like the infusion (Exp. 1).

Experiment 5.—Added acetate of lead in excess to the filtered decoction (Exp. 4). A light olive precipitate was thrown down and separated by the filter, the excess of lead was removed by sulphuretted hydrogen from the filtered liquid, which after this treatment had a light yellow colour, and produced with tinct. ferri muriat. merely a slight olive troubling. Ammonia gave a canary-yellow precipitate, and fresh infusion of nutgalls a light brown precipitate. Evaporated over the water-bath, a gelatinous extract of the colour and appearance of thin glue remained. It tasted like the extract of Matico (Exp. 3), dissolved slowly in water, but was not acted on by ether or solution of potash. From its solution in water alcohol threw down a gray coloured precipitate, acetate of lead ditto ; perchloride of iron produced no change ; caustic potash and ammonia rendered the solution

orange, and threw down rich yellow precipitates. Neither muriatic acid, nitric acid, nor tartar emetic produced any change. The gelatinous extract was dissolved in distilled water, the solution was cautiously evaporated over the water-bath to the consistence of a syrup, which was placed aside in a cool place, and after some hours a number of distinct prismatic crystals had formed in it. These crystals had a brown colour and cooling taste; heated on a slip of platinum foil, they decrepitated and left a yellowish-white residue, which effervesced with hydrochloric acid. In their solution in water chloride of platinum threw down a yellow precipitate. Digested the syrupy extract and crystals in alcohol of 84° (Gay Lussac), its brown colour changed to a clear orange, and the salts collected into a gritty cake. Upon evaporating the filtered alcoholic solution, a yellowish-brown extractive matter, *maticine*, remained. It had a disagreeable smell and exceedingly bitter taste, like aloes, which remained a long time on the palate; it attracted moisture from the atmosphere, dissolved readily in alcohol and in water, but was not acted on by ether: heated on platinum foil it became brown, swelled up without decrepitation, and left a bulky charcoal. Its solution in water was not affected by chloride of platinum, but gave a yellow precipitate with solution of potash, and also with ammonia; chloride of barium did not alter its colour; tinct. ferri muriat. rendered it of a deep rich carmine colour, but did not form a precipitate.

Experiment 6.—A tincture was made by macerating half an ounce of the leaves, reduced to a coarse powder, with four fluid ounces of alcohol of 84°. In half an hour the liquid had a light green colour; after macerating for six days the filtered tincture had a fine brownish-green colour, and the specific gravity 0.860. It possessed in perfection the aromatic astringent taste of the leaves; water made it muddy, but occasioned no precipitate; tinct. ferri muriat. gave a copious brown black, and acetate of lead a greenish-yellow precipitate; solution of potash rendered its colour deep orange, and threw down a deep orange precipitate; ammonia produced a yellow precipitate.

Experiment 7.—The leaves were incinerated and gave fifteen per cent. of a light gray ash, which contained the usual ash constituents. I am at the present time engaged with their quantitative examination, after the excellent method of Hertwig. *Annal. de Chemie und Pharmacie*, xlvi. Bds. 1 Heft.

Experiment 8.—When a portion of the leaves from which all the parts soluble in water had been separated was treated with ether and afterwards with alcohol, *chlorophylle* and a *dark green resin* were procured. The resinous matter was heavier than water, adhered to the fingers with great tenacity, and when heated on platinum foil burned with a strong odour of empyreumatic oil, leaving a bulky charcoal.

From the preceding experiments we may conclude that the leaves of the Matico contain the following constituents: 1. Chlorophylle.—2. A soft dark green resin.—3. A brown colouring matter.—4. A yellow colouring matter.—5. Gum and nitrate of potash.—6. A bitter principle, Maticine.—7. An aromatic volatile oil.—8. Salts.—9. Lignin.

The leaves of the Matico are easily reduced to a fine powder, which has the colour of powdered senna. When mixed with any thick vehicle, as syrup, &c., it presents an excellent mode of administering them, though, as will be evident, only adapted for extemporaneous prescription, as the essential oil, upon which it is probable much of their medicinal effect depends, would be rapidly dissipated by keeping. The cold infusion (Exp. 1), as it extracts all the active principles contained in the plant, seems the best form for obtaining its medicinal properties. The time required for its preparation need not exceed four hours, as in that time water extracts all that can be taken up by a single maceration, and but little is gained by maceration in fresh water, even though continued for a considerable time, as the liquid rapidly acquires its maximum density.—*Proceedings of the Chemical Society.*

BOOKS RECEIVED FOR REVIEW.

RECENT IMPROVEMENTS IN ARTS, MANUFACTURES, AND MINES: *being a Supplement to his Dictionary.* By ANDREW URE, M.D., F.R.S., &c. 8vo, pp. 294. *London: Longman, Brown, Green, and Longmans.*

PRINCIPLES OF FORENSIC MEDICINE. Part III. By WILLIAM A. GUY, M.B. *Cantab.* Small 8vo, pp. 166. *Henry Renshaw, Strand.*

THE LITERARY AND SCIENTIFIC ALMANACK FOR 1845. *A Pocket Book.* By J. W. G. GUTCH, M.R.C.S.L. pp. 239. *London: Simpkin & Marshall, Stationer's Court.*

MANIFESTO *of the Medical and Surgical Association of the Borough of Mary-le-bone.* 8vo, pp. 16.

[The Notices are unavoidably deferred until next month.]

TO CORRESPONDENTS.

"QUÆSITOR."—We know of no such preparation as *carbonate of chloride of iron*, and think the terms *Ferri chloridi carbon*, must have been incorrectly copied from the prescription, instead of *ter chlorid carbon.* The last form of expression is sometimes used in prescriptions for *terchloride of carbon*, a species of chloric ether—(See *Pharm. Jour.* vol. iii., page 170).—(2.) We are not acquainted with the method of preparing the essences of eglantine and mignonette.

"AN ASSOCIATE, CITY."—It would be difficult to get rid of the amylaceous and gummy substances alluded to in the solution, without losing some other ingredients. A menstruum should be used that will not dissolve the former.

W. S., DEREHAM.—Lerebour's *Treatise on Photography*, translated by J. Egerton, contains the latest discoveries appertaining to the Daguerreotype, and the best practical directions for taking portraits. In Hunt's *Researches on Light*, will also be found an account of Photographic processes.

"ERNEST."—We recommend *Parnell's Elements of Chemical Analysis* We cannot account for the failure in the experiment alluded to. (See page 194 of this volume.)

T. B., A. P. S.—(1.) In preparing the *red prussiate of potash*, the chlorine gas should be passed slowly through the solution of the yellow prussiate; much excess of chlorine should be avoided; and the salt when obtained should be recrystallized two or three times.—(2) The solution of oxide of silver in cyanide of potassium will undergo slow decomposition with keeping. —(3.) There is evidently a mistake in the directions for making *perchloride of iron*, in *Fresenius's Chemical Analysis.*—(4). The points alluded to are not yet settled.—(5) Graham, Phillips, Fownes, or Daniell.

G. H. W.—(1.) Water dissolves twice its volume of chlorine gas, but as much of the gas passes through the water without being absorbed, it is necessary to use a much larger proportion of gas than the above.—(2.) In making chlorate of potash by passing chlorine through a solution of carbonate of potash, the introduction of the gas must be continued until the liquid assumes a yellow colour, and crystals of chlorate of potash and chloride of potassium are formed. There will be a loss of some of the gas used in this case, and therefore the quantity required cannot be exactly estimated.—(3.) The formulæ referred to are, we believe, the best.

"An Enquirer."—Dr. Neligan's work on "*Medicines, their Uses and Mode of Administration,*" is a very good and useful one.

"Inquisitor."—(1.) Sulphur has not been decomposed; Davy (*Chemical Philosophy*, p. 284) detected minute portions of hydrogen in it, but they were probably not essential to it.—(2.) What occasions the bitter taste when mustard and vinegar are mixed together without water? [Mustard contains a peculiar bitter acid, called *myronic acid;* and a peculiar kind of emulsion called *myrosyne.* On the addition of warm water, these principles, by a mutual reaction, give rise to the formation of a pungent volatile oil on which the peculiar character of mustard, as used for a condiment, depends. Vinegar and other acids, as well as boiling water, retard the formation of the pungent volatile oil, and the bitter taste is then predominant.]

"Hydrogen" (1) has found a deposit in a mixture of equal parts of sweet spirit of nitre and spring water, after standing a few days. This probably consists of some salt (sulphate of lime?) contained in the water, and rendered less soluble by the presence of the spirit.—(2.) What is the cause of the blue colour in a solution of quinine in water? [What is the cause of the blue colour of anything?]

"Verdatre."—(1). It has been suggested to us by an eminent entomologist, that the insects alluded to as having been found to attack camel's hair pencils, may probably be the larvæ of a small beetle, Anthrenus musæorum, or that of some species of the genus *Tinea.* This genus of moth, as now restricted, lives, in the larva state, almost entirely on animal or vegetable matters, destroying clothing, furs, dried plants, &c., whence the species have acquired the names of T. vestianella, T. destructor, &c.—(2). The best work for the purpose is the *Cours Elémentaire d'Histoire Naturelle,* published for the use of the French colleges. A translation has been published in England by Dr. Carpenter.

Mr. Charles Strange, and another correspondent, have sent communications on Ung. Hyd. Nit., which we have not space to insert.

F. R.—The specimen is not a good one. Call and see a better.

J. S. H. has sent us several samples of drugs, with part of the bill-head of the vendors (the name being cut off), who are "wholesale and retail woollen and linen drapers, silk-mercers, hosiers, druggists, ironmongers, grocers, and undertakers.—*N.B.* Best London hats, funerals completely furnished, and every description of family mourning." We have no remark to make upon the subject, being ignorant of the circumstances of the case.

"An Associate and Founder."—(1). No.—(2). *Hooper's Medical Dictionary* is a good work of the kind.—(3). Galeni.—(4). We cannot tell.—(5). The by-laws of the Society are intended for private circulation among the Members, not to be bound with the *Journal.*

"Tyro."—*Pereira's Materia Medica.*

H. S. F. L. N.—The following is the interpretation of the prescription:—Take a Burgundy pitch plaster, six inches long, six inches wide, and apply it to the region of the heart.

"Franciscus."—Mistura Amygdalæ Amaræ may be made like Mistura Amygdalæ, P. L., substituting bitter almonds for sweet.

Lincoln.—We are not skilled in making crystal cream for the hair.

"Amicus" (London).—*Fownes's Manual of Chemistry, Lindley's Elements of Botany, Pereira's Materia Medica, Selecta è Prescriptis.*

"Monandria."—*Lindley's Elements of Botany,* 10*s.* 6*d.*: Taylor and Walton.

Mr. SAMUEL NEGUS.—The letter was answered by post, and it has been returned stamped "not found."

"SUBSCRIBER."—(1). Liquor Ext. Sarzæ, Co., when properly made, contains the substance of the decoction in a concentrated form.—(2). COLD CREAM, white wax, and spermaceti, of each ℥jss, oil of almonds and rose water, of each ℥x.; mix *secundum artem*, and add otto of roses, &c. *ad lib.* —(3). For the mode of preparing lard for Ung. Hyd. fort., see vol. ii., p. 70.

C. L., M.P.S.—(1). Sol. Copaibæ, see vol. iii., page 67.—(2). Fluid extract of sarsaparilla may be made by concentrating the decoction to any extent which may be desired; the price and the dose being calculated accordingly.

Mr. BIRLEY'S communication is not suited to our pages, and will be returned if desired.

Z., M.P.S.—See vol. i, page 598.

A. B.—(1). The usual method of silvering glass is with tin foil and mercury.—(2). MILK OF ROSES; see vol. iii., page 116.

"ANONYMOUS, PRO. TEM."—We have repeatedly alluded to the subject of late hours, but are not sanguine in the expectation that any material alteration is generally practicable.

G. S. G.—(1). Chloride of silver may be prepared by adding hydrochloric acid to a solution of nitrate of silver, as long as any precipitate is formed.—(2). We have no means of ascertaining the fact.—(3). Five miles.—(4). ESSENCE OF MUSK, proof spirit, Oj., musk, ℥ij., or *ad libitum*.—(5). Dissolve the iodide of iron in the syrup with a gentle heat. See also vol. i., pages 44 and 520.

B. R. S.—*Parnell's Elements of Chemical Analysis*, 10*s*. 6*d*.

"ADOLESCENS."—(1, 2, 3). See vol. i., page 331.—(4). See any English Grammar.

G. S.—(1). We are unable to give any further explanation or suggestion respecting the new method of silvering glass, besides that contained in page 194 of this volume.—(2). Bithyonate of soda is another name for bisulphuret: we presume this is the substance alluded to.

"A CORRESPONDENT" has favoured us with a communication on the manufacture of ink, but we think it is not sufficiently supported by experiments for publication.

S.—No.

"PERSEVERANTIA."—The Secretary, at No. 17, Bloomsbury-square, keeps a book for the names of members who require Assistants, and Associates who want situations.

G. W. S.—Should send both certificates if convenient.

"SPES."—The alteration will most likely take place on the first of January.

"AN APPRENTICE.—A Chemist and Druggist ought to be acquainted with Botany. (See vol. ii. No. 8.)

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to THE EDITOR, 338, Oxford Street. before the 20th of the month.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. VII.—JANUARY 1st, 1845.

PHARMACEUTICAL LEGISLATION.

The position of the medical profession at the present time is critical. The excitement which has for some time prevailed on the subject of the proposed Medical Bill appears to be increasing, and the public press teems with reports of meetings in various places, and controversial discussions of every description. These demonstrations are not confined to the medical journals, but some of the daily papers participate in the general agitation on this intricate subject.

The question of Medical Reform has become a public question; it is generally felt to be obvious that the public welfare is concerned in the regulations which are in contemplation. But the sentiments we hear expressed, and the tone of the arguments used in the periodicals of the day, afford evidence of the fact, that it will be extremely difficult, if not impossible, to arrive at an adjustment of differences, which will be satisfactory to all parties.

The several interests in the profession appear, from all that we can learn, to have coalesced into two parties:—the Physicians and pure Surgeons on one side, and the General Practitioners on the other. Between these two parties a struggle must inevitably ensue during the approaching Session of Parliament; and it is impossible to foresee what may be the result of this contest, since the measures advocated by each party are generally admitted to be seriously opposed to the interests of the other.

If it should prove that the opposing elements are so nearly balanced, that it is impossible to effect an amicable arrangement, it is scarcely to be expected that Sir James Graham will continue his exertions in legislating for a profession which is radically divided against itself; and it is *possible*, notwithstanding the professions occasionally made on both sides, of a disposition to make mutual

concessions, that when the crisis arrives, the Medical Bill may, between two stools, fall to the ground.

Under these circumstances we are of opinion, that the Chemists and Druggists cannot with propriety claim to be included in the provisions of the proposed Bill. By so doing they would rest their hopes of success upon the chance of that measure passing the Houses of Parliament; and, in the event of a failure, they would share in the misfortune. Moreover, if they were to become entangled in the existing controversies, it would be extremely difficult to avoid leaning either to one side or the other; and thus deviating from the straightforward and impartial course which it is particularly desirable for them to maintain. They could not oppose the Physicians and Surgeons, with whom they are naturally allied as dispensers of their prescriptions; it would be impolitic to oppose the general practitioners, which would provoke unnecessary and vexatious hostility; and it would be impossible to act in concert with two parties which are fundamentally opposed to each other.

We are therefore no longer in doubt whether the Chemists ought to be comprised in the Medical Bill, or whether they ought to be provided with a Pharmaceutical Bill to regulate their body. The circumstances above detailed furnish strong grounds for believing that the latter is the right course.

The whole medical profession is interested in the establishment of effectual and judicious legislation in reference to Pharmacy. By the Chemists a large proportion of the prescriptions of the Physicians and Surgeons are prepared; from the Chemists the general practitioners obtain their drugs. It is therefore of the highest importance to the pecuniary interests and professional credit of all medical men, that those to whom is entrusted the responsible duty of furnishing and preparing the remedies prescribed, should be qualified efficiently to perform that duty. That it is just and reasonable for the persons thus qualified to enjoy such privileges and protection as the law can consistently afford, will not be denied by any unprejudiced man, either in or out of the profession.

We presume that the Chemists could have no objection to be placed, with the several bodies in the profession, under the general control and supervision of a Council of Health, constituted on representative principles. We also presume that no opposition would be offered to the claim which the Chemists would naturally make to be allowed to manage the details of their own government—a prerogative which has always been exercised by the other bodies, and which was enjoyed by the Apothecaries at the time that they held the position at present occupied by the Chemists.

An arrangement of this description, having no retrospective operation, would immediately increase the respectability, and gradually raise the qualifications of the whole existing race of Chemists and Druggists, who, we trust, will continue to maintain that unity and friendly co-operation which has, during the last four years, been a subject of congratulation and surprise among the members of the Medical Profession.

At the time that the Pharmaceutical Society was founded, an Act of Parliament was the ulterior object to which the Chemists aspired, as the climax of their exertions and the result of their union into a permanent and recognised body. So numerous and frequent were the appeals of the members at large to the Council, in favour of the speedy accomplishment of this object, that some degree of dissatisfaction prevailed because decisive steps were not immediately taken for that purpose. But at that time it would have been madness to make the attempt. The Chemists had never exercised the functions of self-government; they had never exerted themselves in the promotion of a general and universal education of the members of their body; they had never united for the purpose of advancing their professional reputation; they were not recognised as the representatives of Pharmacy in this country.

On the contrary, they had been proverbially indifferent to their collective interests; the jealousies which existed between individuals had been an obstacle to any permanent union among them, as managers of their own body they were untried, and generally supposed to be incompetent to perform, or indisposed to undertake

the task. The events of the last four years have materially altered their position. They have established the means of carrying out the improvement which it is desirable to introduce; they have demonstrated the efficacy of their plan as far as their limited powers as a voluntary association have enabled them to proceed with it. They are now recognised and incorporated; and their influence as a body has increased more than could have been expected in so short a time.

That the medical profession in general is satisfied with these proceedings is obvious, from the cessation of that vexatious hostility and persecution which prevailed before the union took place; and there is no reason to anticipate any opposition or other misadventure, so long as the Chemists ask for no more than is just and reasonable, and come forward in support of their claims with unanimity and firmness of purpose.

We are therefore sanguine in the hope that the course which the Members of our body have steadily pursued from the commencement of the undertaking, will lead them safely and successfully to the point at which they have been aiming, and at which they ought to arrive during the approaching Session of Parliament.

It must be understood that the above remarks do not emanate officially from the Council, but are offered by the Editor for the consideration of the Members at large, during the interval which must elapse before the Society will be called upon to exert its influence in behalf of pharmaceutical legislation.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF A LECTURE
UPON THE
CLASSIFICATION AND STRUCTURE OF THE LEECH,

DELIVERED BEFORE THE MEMBERS OF THE PHARMACEUTICAL SOCIETY.

BY H. LETHEBY, M.B.,
Late Lecturer on Comparative Anatomy and Physiology in the Medical School of the London Hospital.

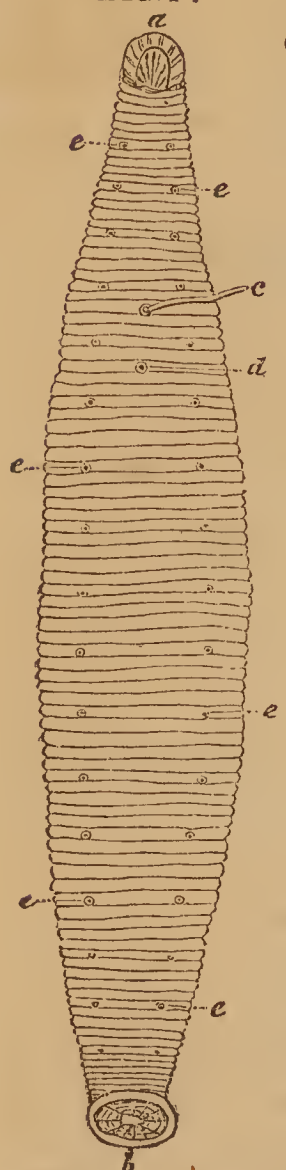
(*Continued from page* 257.)

Part II.—Anatomy of the Leech.

This was considered under the heads of the several systems :—

1. The *Tegumentary System* is composed of three parts; an outer thin transparent layer, called the *cuticle* or *epiderm*, which readily peels off when a leech is dead and becoming putrid : during health it is shed about every fifth day, and constitutes those delicate membraneous films and rings which are to be found floating in the water with the leeches; when unravelled they present a perfect cast of the animal. They have an amorphorus structure, though, doubtless, in an early condition they were composed of plaster epithelium. One of the common causes of disease among leeches, is an inability to throw off this tunic, and we may remedy the evil by placing small pebbles, or a piece of very porous sponge, in the water for them to crawl through. Beneath the epiderm is the *derm*, or *chorion*, or *true skin :* it is a highly contractile reticular tissue, inclosing numerous oblong *pigment cells*, arranged with their long axes perpendicular to the surface, to or from which they are capable of being moved by the partial contractions of the derm ; and in this way, under particular circumstances, the colour of the skin is altered. The derm is excessively vascular, receiving most of its blood from the lateral vessels, and no doubt it performs a very important part in the function of respiration. The skin upon the inferior surface of the body is lubricated

Fig. 4.

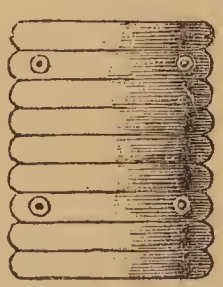


Abdominal surface of the leech; (*a*) anterior disc; (*b*) posterior do.; (*c*) penis; (*d*) vaginal opening; (*e*) mucous openings.

by a secretion, which is poured out from a number of very minute pores. They occur at the abdominal margin of every fifth ring (figs. 4, *e*, and 5), and lead to small vesicles (fig. 6, *c*), which Duges and others have very erroneously regarded as pulmonic sacculi; they are merely the recipients of a mucous formed by a set of looped glands, which lie upon and cross the lateral vessels (figs. 6, *b*, and 12).

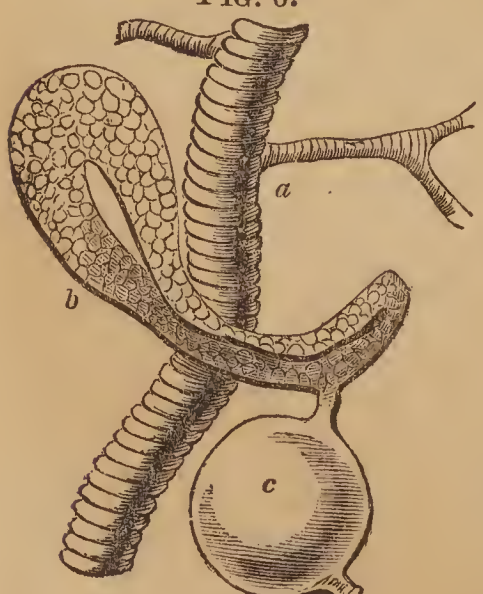
2. *Muscular System.*—The principal muscles lie immediately beneath the skin, and are arranged in three planes or layers, namely an *external transverse*, a *middle oblique*, and an inner *longitudinal*. There is another and more internal perpendicular series, which serves to keep the viscera in place. The sucking discs are also provided with radiating and circular fibres, but they are only prolongations of the longitudinal and transverse muscles. Other special muscles, to be described under the digestive system, have to do with the movements of the jaws and the act of sucking. The three first set of muscles are the principal agents of progression: thus, when the posterior disc has been fixed, the contractions of the transverse muscles will prolong the anterior extremity, while the oblique can effect a movement to either side; then the leech, having attached the mouth sucker, and loosened the posterior one, contracts the longitudinal set, especially on the abdominal surface, and so shortens the body and brings forward the tail disc to be again fixed—Under the microscope the muscular fibres do not exhibit any of those cross markings which are so characteristic of the voluntary muscles of all other animals higher in the series.

Fig. 5.



Openings of the abdominal mucous glands.

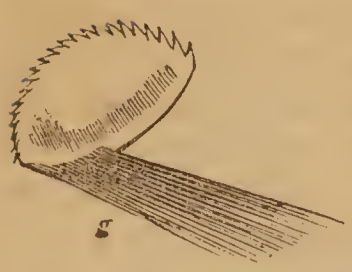
Fig. 6.



(*a*) Lateral vessel with transverse muscular markings; (*b*) a looped gland; (*c*) its mucous receptacle or sac

3. *Digestive System.*—The *mouth* is situated in the centre of the anterior sucking disc, upon the inferior aspect of the body, and is surrounded or fringed by a very delicate and sensitive labium (fig. 4, *a*). Immediately within it are three semilunar *cartilaginous jaws*, arranged in a triradiate manner: they are armed in the blood-sucking

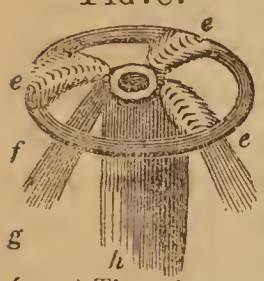
Fig. 7.



Jaw of the leech, (*g*) the ad-rotator muscle.

leeches with about eighty sharp calcareous teeth (fig. 7), whose points are all directed a little inwards, and they progressively increase in size from within outwards. In the horse-leech these teeth are blunt, few in number, and not firmly implanted in the jaw, so that it is deprived of the power of biting. Internally the three jaws are connected by an elastic ligament (fig. 8), which has an opening for the gullet in its centre; externally they are attached to the parieties of the mouth by a circular band of muscles, the *ab-rotatores* (fig. 8, *f*); and passing from the inner angle of each jaw, downwards and outwards, there is another set, the *ad-rotatores* (figs. 7, 8, and 9, *g*). The *œsophagus* intervenes between the mouth and the first compartment of the stomach; it has a globular or oval form, (fig. 10, *a*) and is surrounded by transverse and longitudinal muscles (fig. 8, *h*); a more external series radiate from it on all sides; they are the *dilators* of the œsophagus (fig. 9, *i*). In the act of sucking, the anterior disc is attached firmly to the skin, by which means the jaws are brought to bear upon its surface, and then, by the alternate actions of the ab- and ad-rotator muscles, assisted by the longitudinal fibres of the œsophagus, the jaws are made to perform a half rotation; the down and inward stroke being the most effective. In this manner they gradually saw their way into the skin, making a triradiate wound. As soon as this is effected, the radiating muscles of the œsophagus are brought into action, so as to dilate its globular part, and blood is thus sucked down to fill it. The transverse, or constrictor muscles now contract and force its contents into the stomach—by a succession of such acts the leech becomes gorged. The *stomach* (figs. 10 and 11) is an immense sac, completely filling the animal; it consists of ten or eleven compartments, with their lateral cæca; the two last being prolonged quite to the extremity of the body. It has been a question whether these cæca are not supplimentary glands; but from the readiness with which they are filled and from many analogies in other annelida, there can be no doubt of their stomachal office. They are lined upon their interior with large nucleated cells. The *small intestine* is a narrow tube arising from the last compartment of the stomach (figs. 10, *q*, and 11, *c*); it runs back between the two posterior cæca, and terminates in

Fig. 8.



(*e e e*) Three jaws; (*f*) circular or ab-rotator muscle; (*g*) ad-rotator, (*h*) œsophagus with longitudinal and circular muscles.

Fig. 9.

Section of œsophagus; (*e e*) jaws; (*g g*) ad-rotators; (*i i*) radiating or dilating muscles.

Fig. 10.

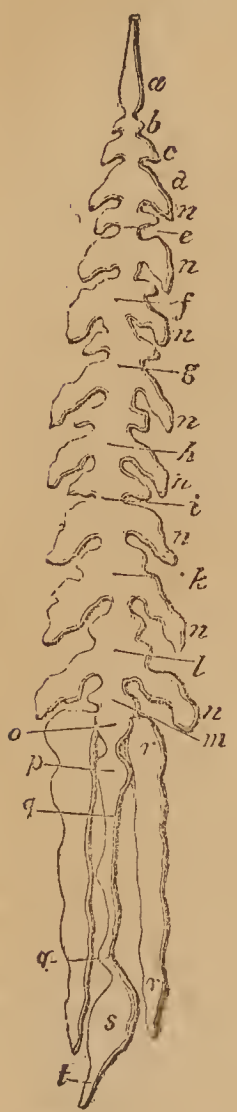


Fig. 10. Alimentary canal of leech empty; (*a*) œsophagus; (*b* to *m*) cæca; (*o q*) small intestine; (*s*) rectum.

Fig. 11.

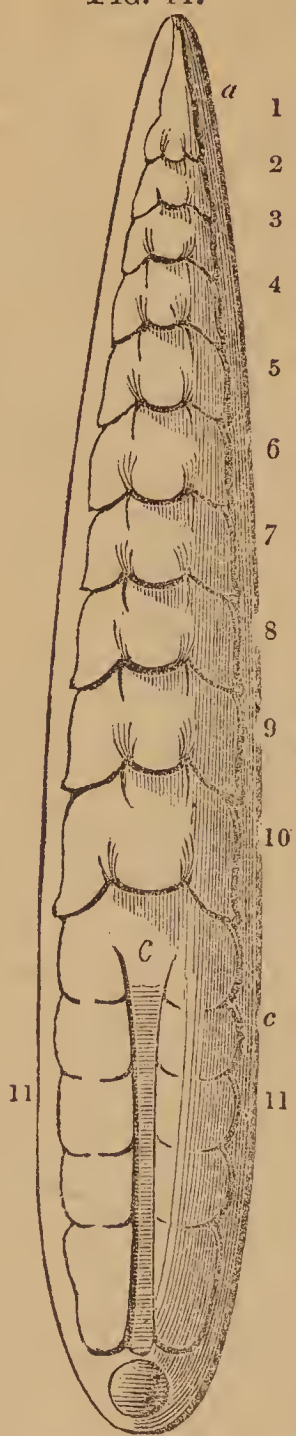
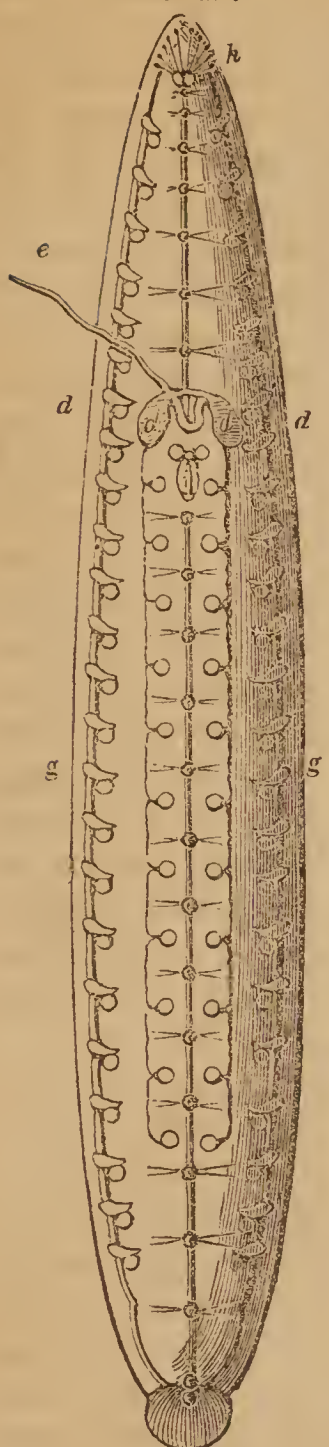


Fig. 11. — Alimentary canal of the leech filled with blood, composed of (*a*) œsophagus; (1 to 11) stomach with cæca; the two last (11, 11) prolonged; *c* small intestine.

the *anus* or *vent* upon the dorsal edge of the disc: it is covered internally with minute transverse folds, *valvulæ conniventes*, and exhibits the openings of the biliary ducts. Sometimes before it terminates in the anus it becomes dilated, and forms a *rectum* or *large intestine* (fig. 10, *s*, *t*). The *supplimentary glands*, which have been described by Brandt and others, are the *salivary* and *hepatic*. The former exists as a white stratum around the œsophagus, and the latter as a layer of small brownish cæca upon the ventral surface of the stomach: their tubes unite to form two ducts, which terminate at the commencement of the small intestine.

4. *Vascular System* consists essentially of four longitudinal vessels, a dorsal, a ventral, and two lateral, together with a multitude of communicating branches. The *dorsal vessel* is formed posteriorly by the union of two parallel trunks, named from their position, *dorso-intestinal* and *dorso-dermal*; it proceeds forwards to the head, and there divides into two branches, which surround the gullet, and unite below with the ventral vessel; in its course it gives off numerous transverse branches, which ramify principally upon the alimentary canal. The *ventral vessel* arises from the two œsophageal branches of the dorsal, and passes backwards, in immediate apposition with the nervous cord, to end in a multitude of small branches, which are lost in the posterior sucker, its branches correspond with those of the ganglia, and are distributed for the most part upon the stomach, a few are also sent to the skin and muscles. The *lateral vessels* (fig. 12, *g*) proceed in a wavy course, one up on each side of the body; they communicate with each other

FIG. 12.



The various parts in situ—In the central line is the double nervous cord, on each side of this the eleven pairs of testes, with the zig-zag vas deferens, which terminates in the vesicula seminalis (*d d*), between which is the penis (*e*) and its bursa; (*f*) the uterus and two ovaria; (*g g*) the two lateral vessels, with the looped glands and sacculi; (*h*) the ten eyes.

at both extremities; and also during their course, by numerous transverse branches, which creep under the stomach; at regular intervals, they give off a short trunk, which divides almost immediately into two branches, a *dorso-lateral* to be distributed upon the skin of the back, and a *latero-abdominal* which goes to the integument of the abdomen. Towards the posterior third of the body, the dorso-lateral branches increase very much in size, and unite over the intestine to form about six arches, which are brought into communication by two longitudinal trunks; all the branches of these four vessels inosculate very freely with each other, and the principal ones are covered with circular muscular fibres (fig. 6, *a*), by the agency of which they pulsate or contract upon their contents, and I believe that the blood does not pursue any determinate or regular course, but that it sometimes undulates in one direction, at other times in the opposite. When a leech is opened alive, the lateral vessels are seen to pulsate about ten or eleven times a minute, but the order of pulsation is not regular; it is moreover probable from the distribution of the blood, that the dorsal and ventral vessels preside over the functions of nutrition and absorption, while the lateral have to do with respiration; but their free inosculations must necessarily produce a frequent interchange of the contents. The *blood* of the leech is of a red colour, and contains a few irregular nucleated globules or corpuscles, which vary in size from about the $\frac{1}{6000}$th to $\frac{1}{4000}$th of an inch.

5. *Respiration.*—This is no doubt performed by the skin, although Duges and others have assigned it to the looped organs and sacs (fig. 6, *b*, *c*) which lie upon the lateral vessels, but their position, structure, and contents, warrant the belief that they are mucous glands.

6. *Nervous system* consists of a brain and a series of ganglia, connected by a double nerve along the abdomen (fig. 12). The *brain* or *supraœsophageal* ganglion is situated over the œso-

phagus, it gives off ten optic nerves (fig, 12, *h*), and several branches to the labium; two large commissural nerves pass off from it laterally to wind round the gullet, and join the *first ventral* or *subœsophageal ganglion*, which, from its supplying all the muscles about the mouth, may be regarded as the analogue of the *medulla oblongata*. The other ganglia, about twenty-two in number, give off transverse branches in their course to the muscles and viscera, and are the representatives of the *spinal cord*. They are interesting microscopic objects, inasmuch as they exhibit the manner in which the several nervous fibres cross to form commissural loops, and they show also how they are brought into communication with the ganglionic cells. *Organs of special sense.*—We are not prepared to say that the leech is endowed with more than three senses, those of sight, taste, and touch, all the apparent manifestations of *feeling* may be merely reflex actions. The *organs of vision* consist of ten black mullar-shaped eyes, arranged in a semicircular form upon the upper surface of the anterior disc (fig. 12, *h*); they are mere expansions of the optic nerves, covered posteriorly with a black pigment; they have no lens or other focal contrivance, and can, therefore, only be subservient to the bare discrimination between light and darkness. *A sense of taste* is presumed to exist from the circumstance of their selecting or refusing certain foods, and it is no doubt situated in the labium, which is also a delicate *tactile organ*.

7. *Reproduction.*—The leech like the rest of the annelida, is *androgynous*, each individual possesses both male and female organs, but they are incapable of self-impregnation. *Male organs* (fig. 12).—There are from nine to eleven pairs of *testes*, placed along the abdominal surface between the folds of the cæca. Their short ducts pass outwards to join a long zigzag tube, the *vas deferens:* it runs up along their outer margin, to terminate in or form by a great number of convolutions, the body called the *vesicula seminalis* (fig. 12, *d*); from this there passes off a tolerably large muscular tube, the *ejaculator seminis*, to enter the base or *prostatic* portion of an organ which is bent upon itself, and encloses the penis, hence named the *bursa* or *sheath* of the penis. This opens externally upon the abdominal surface of the twenty-fourth ring, the penis can be protruded to the extent of half-an-inch (fig. 4, *c*, and 12, *e*), it has a tortuous urethra, and a granular structure at its apex. The contents of the sperm glands when examined at different periods of the year, illustrate the manner in which the spermatic filaments are developed, at first the cells appear with one or two large nuclei, subsequently these nuclei break up, and the cell becomes filled with minute granules (*nucleoli*), these soon arrange themselves in a linear form, and

after a time exhibit a vibratile motion. The cell then breaks, and the perfected spermatozoa escape. *Female organs* (fig. 12, *f*) are situated immediately below the bursa penis, and between the two vesiculæ; they consist of two *ovaria*, whose tubes unite to form a short and slightly flexuous *oviduct*, which joins the lower end of a pear-shaped *uterus*, the tube or vagina of which opens five rings below the penis (fig. 4, *d*). The parieties of the uterus are very muscular.

8.—*Impregnation and Development of the Ova.*—In the early state the ova are seen in the ovaria and oviducts as minute globules, consisting of a germinal vesicle and its yelk; lower down they receive a covering of albumen; and when they reach the uterus they are in a condition to be fæcundated. Leeches copulate by reversing the direction of their bodies, and bringing the male organ of the one into juxta-position with the vulva of the other, so as to effect a mutual impregnation. Soon after this the uterus is found to be considerably distended, and the next duty is to relieve it of its burden. The blood-sucking leeches bury themselves in the mud at the sides of the pond when they deposit their ova, and consequently the process cannot be watched; but Dr. Johnson has described the manner in which it is accomplished by the rivulet-leech (*Hirudo vulgaris*): he says, "Four or five days after copulation it exhibits a contraction above and below the uterus, and fixing itself by its posterior sucker, which it never loosens during the operation, it throws out a milky white substance between the constrictions, and by a a great effort expels the whole of the contents of the uterus into it. This done the animal narrows its body and withdraws itself from the ring. The capsule thus formed is excessively elastic and of no determinate figure, but the leech fixes it to some object, and with its mouth fashions it into an oval body, called a Coccoon, leaving the points from which it drew itself out weaker than the rest. These coccoons contain about six or eight ova, enveloped in a jelly-like fluid; they gradually enlarge, and in six weeks the young leeches are matured and ready to escape. The coccoons of the medicinal leech are about an inch long; they look like an oval piece of sponge, and contain from six to fourteen ova. I have no doubt that they are formed in a similar manner. There is an opinion prevalent that the leech takes charge of the coccoon, and has something to do with its maturation, and also that it is occasionally viviparous; but I am inclined to think that both of these opinions are without foundation.

PHARMACEUTICAL MEETING,

DECEMBER 11th, 1844.

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

ON THE ACTION OF LEAD IN DISTILLED AND RIVER WATER.

BY RICHARD PHILLIPS, JUN.

Although this subject has been previously brought before the notice of the members of this Society, there exists so much difference of opinion upon it, that the detail of some experiments I have made may not prove uninteresting.

And here it may be as well to point out the action which forms the subject of investigation; in the two bottles which are on the table, one of them containing distilled water, and the other Thames water, about six years since two pieces of bright lead of nearly equal size were immersed, in both experiments the lead was allowed to remain rather above the water, and was freely exposed to the action of the air; in a short time a quantity of yellowish white pearly scales appeared on the lead, in the bottle which contained the distilled water, these, after a short time were detached from it and sunk; fresh ones were then formed, and this process has been going on until a large quantity of a white precipitate has accumulated; whilst in that containing the Thames water hardly any action was apparent.

The points of interest which appear to arise from these facts are as follows: — 1st, Whether it is necessary that the lead should be exposed to the air; or whether the action would take place if it were below the surface of the water. 2dly, Whether pure or distilled water, deprived of all atmospheric air, has any action on lead. 3dly, As to what is the nature of the white precipitate. 4thly, If, besides this white precipitate, any soluble salt of lead is found; and 5thly, as to which of the salts contained in river water the non-formation of the white precipitate is due.

These subjects, I am aware, have been already investigated, and principally in this country by Dr. Christison, his observations appearing in his work on Poisons; and as I differ in some respects from them, I shall, as briefly as possible, review his opinions, and the experiments on which they are founded. The first question does not appear to have been noticed by him; but, with regard to the second, namely, whether distilled water, deprived of all atmospheric air has any action on lead, he con-

siders that it is without any, but does not give the details of the experiments he performed.

As to the next question, the nature of the white precipitate, Dr. Christison, in the earlier editions of his work, stated, that it was a pure carbonate, as he found that it redissolved with effervescence in acetic acid. Since then, however, Colonel Yorke has investigated the subject in the *Philosophical Magazine* for August, 1834, and finds it to be a mixture of hydrated oxide and carbonate of lead; the action being that a hydrated oxide is first formed, which afterwards attracts carbonic acid from the air and becomes carbonate. He carefully analyzed a portion of the precipitate, taking the precaution to first dry it under the air-pump; and gives the following, as what he believes to be its composition and formula:

Oxide of Lead	87.9
Carbonic Acid	8.6
Water	3.5

Or $2\dot{P}b+\ddot{C}+Aq$.

In the later edition of his work, Dr. Christison appears to agree with this, except that he believes a greater quantity of carbonic acid to be present than Colonel Yorke states.

The next subject is the existence of a soluble salt of lead in the water besides the white precipitate; and here Dr. Christison agrees with Colonel Yorke, although for different reasons. He considers that a soluble salt does exist, and that it is formed by the further action of the carbonic acid on the carbonate, and holding it in solution; and his experiment was to filter some of the liquid above the white precipitate, and evaporate it to dryness; the residue then redissolved, and with effervescence, in acetic acid, which was not the case if it was previously heated to redness. Colonel Yorke however looks upon the soluble salt as the hydrated oxide, which he believes to be slightly so, estimating its power of solubility in water at a 10,000th part. His reason for not believing it to be a carbonate, is, that on filtering the liquid and evaporating it to dryness under the air-pump, the residue dissolved in acid without effervescence.

The action of the salts contained in river water to protect the lead, has been principally investigated by Dr. Christison, and he believes them all to possess this preservative power, namely, the sulphate and bicarbonate of lime, and the common salt. the power depending on the acid, and not on the base of the salts, a 4000th part of sulphate of lime, and a 2000th part of chloride of sodium, being capable of exercising this power.

I shall now proceed to detail my own experiments on the above subjects, and there are on the table two bottles, which will illustrate the first; they containing distilled water, in them at the same time were placed two pieces of lead of nearly equal

size: in both a white precipitate has occurred, but in that in which the lead has been exposed above the surface of the water, there is a far greater quantity of the precipitate than in the other, where the lead is covered with the water, and we may conclude from this experiment, that although it is not necessary that the lead should be exposed above the surface of the water for the action to take place, still, by offering a passage, if I may so express it, to the gases contained in the atmosphere, it accelerates it.

I have before stated Dr. Christison does not describe the method by which he performed his experiment on the nonsolubility of lead in pure distilled water, and although I agree with him as to the fact, as I found some difficulty in ascertaining it, I will describe the process I followed. I found that on boiling pure distilled water so as to deprive it of all atmospheric air, that when it had regained its former temperature, and was placed in a well-stoppered bottle with a piece of lead, the bottle being perfectly full, although no action was apparent, and the lead remained almost as bright as when first placed in the bottle; yet if a little hydrosulphuric acid was added to the water, it instantly became of a brown colour, showing the presence of lead, the water having on cooling absorbed sufficient atmospheric air to act on the lead. If, on the contrary, the water was placed in the bottle when warm, and the lead immediately added, and the bottle stoppered, on cooling a vacuum was formed, which it was impossible to maintain, and the lead was acted upon. I therefore repeated the last experiment, but took the precaution when the bottle was quite full, and no vacuum had formed, to plunge the stopper under mercury, and to pour water above the mercury. The experiment was allowed to remain for some months, the lead retained its original brightness, and on breaking off the neck of the bottle, it being impossible, on account of the vacuum, to take out the stopper, not the slightest effect was produced on the liquid by hydrosulphuric acid, thus proving that pure water, without the presence of air, has no action on lead.

From my experiments I am led to the same conclusion as Colonel Yorke, as to the manner of the formation of the white precipitate; in fact, I have obtained small masses of crystalline scales, which have formed on the surface of lead, which have dissolved without the slightest effervescence in acetic acid. I do not think, however, any fixed composition can be assigned to this substance, as on repeating his experiment of drying it under the air-pump upon two different specimens, one of which had been kept some years, and the other only a few weeks, in the former a much larger amount of carbonic acid was found than in the latter, showing that the precipitate had no definite composition, but that it depended as to the quantity of carbonic

acid, on the length of time it had been exposed in the solution.

As to the existence of either of the salts of lead mentioned, in a soluble state, I must confess that I differ with the two authorities I have named, and believe that what they consider to have dissolved, is merely the hydrated oxide of lead held in a state of mechanical suspension, and for the followiag reasons: I found on repeating an experiment of Colonel Yorke's (that of precipitating hydrated oxide of lead, and washing it with warm distilled water), the filtered liquor gave a brown precipitate with hydrosulphuric acid, after all the soluble salts formed had been washed away; but that on refiltering a portion of it through more than one filter, not the slightest discoloration was given to the liquor by the test, And as Colonel Yorke considered that soluble salt was the hydrated oxide, a greater quantity of which would exist, as already shown, at the commencement of the action of the lead on the water, I placed a piece of lead in distilled water, and carefully tested the filtered liquor daily, for some weeks, with hydrosulphuric acid, but in no case could I find the slightest discoloration given to it. Now as the test is so delicate as to be capable of discovering, according to Plaff, a 100,000th part of the metal in solution, if, as Colonel Yorke states, that a 10,000th part of the oxide is held in solution, the test would of course have distinctly shown it.

Dr. Christison considering that the action of the formation of a soluble salt of lead was due to the carbonate of lead, becoming converted into bicarbonate, by long exposure, I tested the liquid from one of the experiments I have beforementioned, where the lead in distilled water had been exposed to the action of the atmosphere for six years, and could not detect the slightest discoloration after the solution had been carefully filtered. I therefore conclude from these experiments, and I believe Dr. Thomson has previously arrived at the same result, that no soluble salt of lead is formed by the action of atmospheric air on lead in distilled water.

In examining the last question, *viz.*, which of the salts contained in Thames water prevented the action upon lead, I found that it was due to the sulphate of lime, for, on removing the coating that had formed on the lead (which, as Dr. Christison observes, prevents further action by forming an insoluble compound upon it) it was insoluble in dilute acid, the filtered liquor giving no discolouration with hydrosulphuric acid, but in caustic soda it readily dissolved, and the solution gave a black precipitate with the test. As Dr. Christison had stated, that all the salts contained in the water were capable of protecting the lead, I placed in three bottles, containing dilute solutions of sulphate of lime, bicarbonate of lime, and chloride of sodium, three

pieces of lead; in the two first the lead was perfectly protected, but in the last a precipitate took place. I also found that a soluble salt of lead existed, and that the liquor was slightly alkaline. These facts prove that, although the chloride of sodium, when a strong solution is present, has some effect in protecting the lead, still it does not do so altogether; for, when it is decomposed, and the chloride of lead formed, it being partially soluble, does not protect the metallic lead from further action; *whilst the sulphate and bicarbonate of lime*, by forming an insoluble sulphate and carbonate of lead effectually do so. The precipitate in the solution of common salt, I found to consist of chloride of lead and oxide of lead, the oxide of lead being most probably formed by the action of the liberated soda on the soluble chloride. I may add, that my experiments were made with pure salt, which was found to contain neither lime, iron, magnesia, or any sulphates; and might I suggest, that the reason of what appears to me to be the error concerning the action of salt, may arise from the salt employed containing a soluble sulphate, which, in all samples I have tried, I have found to be the case, and which would have the effect of protecting the lead.

There still exists one more point to which I wish to draw the attention of the Society, on account of its being a matter of curious speculation: Dr. Christison notices, that rain water, when it falls, after a long continuance of dry weather, has but little effect on lead; but that after it had rained for some hours, the water readily attacks it: he imagines this to be due to the accidental earthy ingredients it might at first dissolve from the roofs of buildings—might it not perhaps be due to the ammoniacal gas contained in the atmosphere, which, as Liebig has shown, is dissolved by the rain water in the form of carbonate?—a mere trace of which salt will, as I have found by experiment, protect the lead from corrosion.

Craig's Court, 12*th December*, 1844.

Mr. Squire asked whether Mr. Phillips had made any experiments on the influence of water on lead in conjunction with other metals. He had frequently observed nodules of lead about the angles of cisterns in the neighbourhood of the solder, and it would be interesting to ascertain how far the new process of making the joints of lead vessels by means of the hydrogen blow-pipe, might diminish the evil. He had recently been obliged to replace the bottom of a cistern of several hundred gallons capacity, in consequence of the perforations occasioned by the action of the water.

Mr. Phillips replied, that he had not made any experiments with this object, but allusion was made to the subject in the paper of Colonel Yorke.

REMARKS ON SOME PECULIARITIES IN EXTEMPORANEOUS PRESCRIPTIONS.

BY MR. JACOB BELL.

The term *incompatible* is used in reference to substances which cannot be mixed without some decomposition and change of properties taking place; but it does not follow because decomposition ensues that such combinations should never be made. There are many cases in which very efficacious remedies are produced by the union of substances which lose their original character when brought together; but it sometimes happens that in this manner changes are effected, which were not contemplated by the prescriber, and which are attended with some results which would not, *à priori*, have been anticipated.

The following remarks are not intended at all as a criticism upon any of the combinations, but are made for the purpose of pointing out a few simple facts, the result of observation, which may possibly be of use, by directing attention to a very interesting subject. The illustrations are not imaginary, but are all taken from prescriptions which have been prepared.

The combinations of iodide of potassium furnish several examples.

℞ Potassii Iodidi ʒss.
Potassæ Bicarb. ʒj.
Tinct. Guaiaci ʒij.
Mellis ʒij.
Aquæ destillatæ ʒiiiss. Capiat ʒj. ter die.

This mixture is of a bright grass-green colour The change is very remarkable, and might occasion surprise; but the colour fades in a day or two. When tinctura guaiaci ammoniata is used, the colour deviates less from that which might naturally have been expected.

℞ Potassii Iodidi ʒss.
Iodinii gr. ss.
Infus. Zingib. ʒviiiss.
Syr. Zingib. ʒss. M. fiat mistura.

This mixture is of a dark blue colour, which is occasioned by the action of the iodine on the starch contained in the ginger.

℞ Potassii Iodidi ʒj.
Acidi acetici fortius ʒj.
Sp. Camphoræ ʒss.
Ol. Olivæ } aa ʒss. M. fiat linimentum.
Mellis. }

The iodide is dissolved by the strong acetic acid, with very little discoloration. The camphor is not precipitated when added to the solution. The honey and oil being triturated in a mortar, and incorporated with the other ingredients, the result is a much more elegant liniment than might have been expected.

℞ Tinct. Iodinii Comp. ʒj.
Liquoris Potassæ ʒss.
Sp. Ætheris Nitrici ʒiij.
Aquæ. ʒj. M. Capt. Coch. j. min. e cyatho aquæ bis die.

In this case a yellow precipitate is thrown down, consisting of *iodoform*, or, according to some Chemists, iodide of carbon. It arises from the decomposition of the alcohol, and does not take place unless alcohol or some analogous body, such as pyroxilic spirit, be present. The liquor iodinii comp. of the London Pharmacopœia is not liable to this objection, and may be mixed with liquor potassæ without producing any precipitate.

An ointment made with iodide of potassium and pure lard is white, and remains so; but if spermaceti ointment be substituted for lard, it is generally found to be more or less coloured, which colour becomes darker by keeping, and shows that free iodine is present. This may probably arise from the wax having been bleached with chlorine, of which a trace is retained by it; and thus a minute portion of iodine is liberated.

Iodide of potassium should always be rubbed with a little water to a state of solution or impalpable division, before the lard or ointment is added; otherwise it is impossible to mix it completely, and the small particles of the iodide, which feel like sand in the ointment, irritate the skin.

Cloves and Iron.—

℞ Infusi Caryoph. } aa ʒvj.
" Quassiæ }
Tinct. Ferri Sesquichloridi. ♏xij.
" Cardam. Comp. ʒj. Misce, fiat haustus.

This compound is so black that the patient might suppose that the bottle had been accidentally filled with ink. The colour is always produced when cloves are combined with a persalt of iron. This was lately exemplified by compound infusion of orange-peel becoming black on the addition of tartrate of potash. On investigation, it was discovered that the tartrate, having been prepared in an iron vessel, was contaminated with a small portion of the metal.

Infusion of Chirayta.—Some mixtures containing this preparation are liable to become gelatinous; for instance, the following:—

℞ Infusi Chiraytæ ℥viiss.
Ferri Ammonio Citratis gr. x.
Syrupi Aurantii ʒiv.
Tinct. Calumbæ ʒij. M.

The only form for the infusion of chirayta which has been published on any authority, is half an ounce of the herb to one pint of boiling water, macerated for two hours. Some prac-

titioners who have been in the habit of prescribing the remedy in India, have told me that this is too strong, and that a drachm to a pint is sufficient. Mr. Squire recommends tepid, instead of boiling water, and considers two scruples to a pint the best proportion. In either of the two latter cases gelatinization does not occur, and it is only in some combinations that it takes place with the strong infusion. Mr. Fordred, some time ago, noticed a similar change in a mixture containing infusion of gentian and solution of potash.

The following prescription is still more mysterious :—

℞ Conf. Aromat. ʒij.
Aquæ ʒvss.
Syr. Zingib. ʒss.
Tinct. Opii gtt. xxx. M.

This was prepared about two months ago, and was brought back by the patient in a gelatinous state. Two bottles of the mixture are on the table.

Compound Tincture of Cardamoms with alkalies.—

℞ Ammoniæ Sesquicarb. ʒss.
Sodæ Sesquicarb. ℈ij.
Tinct. Cardam. Comp. ʒss.
Aquæ Menthæ piperitæ ʒv.

Mixtures of this description frequently occasion trouble by changing colour. At first the colour is slightly augmented, and assumes a purple tint; but in the course of a day or two it almost entirely disappears, especially in hot weather. The patient observes that the new mixture is not like the last dose which remains in the former bottle, and sometimes concludes that a mistake has been made.

The colour of *syrup of saffron*, when mixed with liquor ammoniæ acetatis and sp. ætheris nitrici, in the common fever mixture, is well known to fade in the course of a few days.

Cinchona.—We not unfrequently see prescriptions in which decoction of bark is combined with carbonate of ammonia or soda, as in the following prescription :—

℞ Decocti Cinchonæ ʒvij.
Ammoniæ Sesquicarb. ℈ij.
Syr. Aurantii
Tinct. Cardamomi Comp. } aa ʒss. M.

A white precipitate is the result, which is the alkaloid of the bark. It is probable that this may not lose its medicinal effect by the change; in fact, this particular mixture is said to be very efficacious in some febrile disorders attended with debility.

The tinctura cinchonæ ammoniata is not a scientific preparation, as the active precipitate in this case is separated and lost. It nevertheless is a favourite remedy with some practitioners, and probably derives its efficacy from the ammonia, with tannic and kinic acids, and a small portion of the extractive matter of the bark.

The following cannot be considered an elegant mixture :—

℞ Liquor. Opii. sedat. ℥viij.
Quinin Disulphatis ℈j.
Ammon. Sesquicarbonatis ʒss.
Aquæ Menth. pip. ʒiv. Cap. Coch. j. min. ter die.

Tinctura Opii, when combined with liquor arsenicalis, is decomposed, as in the following prescription :—

℞ Tinct. Opii ʒiij.
Liq. Arsenicalis ʒv.
Aquæ Anethi. ʒvij. Misce, ft. guttæ.

A dense brown precipitate is thrown down, and the supernatant liquor is almost colourless.

℞ Tinct. Opii, Liq. Plumbi diacetatis } aa ʒij.
Aq. flor. Sambuci ʒvss. Misce, fiat lotio.

In this prescription a copious precipitate is thrown down, meconate of lead and acetate of morphia being formed. The union of the above ingredients is not uncommon ; and the decomposition is probably not objectionable.

Sulphate of Zinc and *biborate of Soda.*

℞ Zinci Sulph., Sodæ Biboratis } aa ℈ss.
Aq. flor. Samb. ʒvj.
Vini Opii ℥xij. Misce, fiat lotio.

A flocculent precipitate is thrown down, which carries with it the colouring matter of the opium.

Borax has been said to be incompatible with compound infusion of roses, but it produces no precipitate or change of colour, and a gargle consisting of two drachms of borax to half a pint of the infusion is neither unpleasant nor inefficacious.

Magnesia.—It has often been observed that mixtures containing calcined magnesia and sulphate of magnesia, combined with tincture and infusion of senna, or with tincture of jalap, or colchicum wine, deposit the magnesia in a solid form. After a few weeks, this deposit becomes so hard and compact, that it cannot be removed without breaking the bottle. When bruised and treated with water, it is found to be almost entirely insoluble. When it is boiled in water, and the mixture is evaporated to a concentrated state, no crystallization ensues, although as much as an ounce of sulphate of magnesia, with three or four drachms of calcined magnesia, may be present. This concretion does not take place where carbonate of magnesia is employed, and it does not become quite solid unless some tincture or infusion containing vegetable extract or gum be present. Mucilage, which is sometimes ordered with the view of suspending the magnesia, increases the evil. It appears, therefore, that a portion of the sulphuric acid of the sulphate combines with the calcined magnesia, forming an in-

soluble subsulphate, which, when pure, is thrown down as a semigelatinous mass, but which, when a tincture or infusion is present, unites with the resinous and extractive matter, and becomes solid. Colchicum wine is particularly favourable to this result, and tinctures in general promote it more readily than infusions. The subject deserves some further investigation.

A Correspondent lately wrote to me respecting the following mixture, in which he had observed a similar result, occasionally, though not always.

℞ Magnesiæ Calcinatæ } aa ʒiij.
Sodæ Subcarb. }
Mist. Camph. ʒviij. M.

On making the mixture it was found to be rather thick, as might be expected, but it did not form any solid deposit during several weeks.

Spiritus camphoræ is miscible with *liquor plumbi diacetatis* in the proportion of two parts of the former to one of the latter, and in this form it is a convenient preparation, sometimes ordered as a concentrated lotion, to which water is to be added by the patient. But if a larger proportion of liquor plumbi be added, the camphor is partially precipitated.

We are told that *distilled water* should occasion no milkiness when mixed with *liquor plumbi diacetatis ;* but in practice it is always found to be more or less turbid on account of the carbonic acid contained in the water.

Liquor calcis and *liquor potassæ* are sometimes ordered in combination, and notwithstanding all the care that may be taken, a cloudiness, or even a slight precipitate, will occur. Even if this be not evident at first, it will take place before the patient has finished the mixture, in consequence of the admission of air into the bottle every time the cork is removed.

Ceratum plumbi comp., when made with yellow wax, becomes white in blotches, that portion which is exposed to the air being bleached first, but when made with white wax, it is more liable to become rancid, and is not so good an ointment, although more uniform in appearance.

Extract of Belladonna is sometimes ordered in an ointment. To make the combination, it is necessary to soften the extract with a little water before the simple ointment is added. This preparation becomes mouldy in a week, but by the addition of a little soap, it may be kept unimpaired for several months.

In many of the instances above alluded to, no detailed explanation of the changes which took place is attempted ; the object of the paper having been to bring together a number of facts which would have been too voluminous if each case had been made the subject of minute investigation.

338, *Oxford Street, Dec.* 10, 1844.

The Chairman said, he hoped some discussion would arise on the paper which had just been read, as he had no doubt that every one present must have met with cases of the kind alluded to, which occasioned some little perplexity.

Mr. Squire observed, with reference to the infusion of chirayta, that he had made a series of experiments on the bitter infusions in general; and had come to the conclusion, that tepid or even cold infusions were preferable to those made with boiling water. Although boiling water might in some instances extract a larger quantity of matter, this was generally in a more or less altered state, and sometimes comprised principles which it was desirable to exclude: for instance, in the case of infusion of ginger, as alluded to in the paper, the blue colour would not have been produced if the infusion had been made with cold water, which would have dissolved none of the starch.

Mr. Phillips, jun., said, he had also made experiments with hot and cold infusions; and thought the latter quite as strong as the former.

Mr. Bell confirmed this opinion; but observed, that a longer time was required for extracting the properties of the ingredients with cold water than with hot, and this appeared to be the only objection—time being often an object in the preparation of medicines.

Mr. Ure thought the change which had taken place in the mixture containing aromatic confection, appeared to resemble what had been described by Dumas as the viscous fermentation. He found it had an acid reaction on litmus paper, and thought it possible that the chalk had been decomposed.

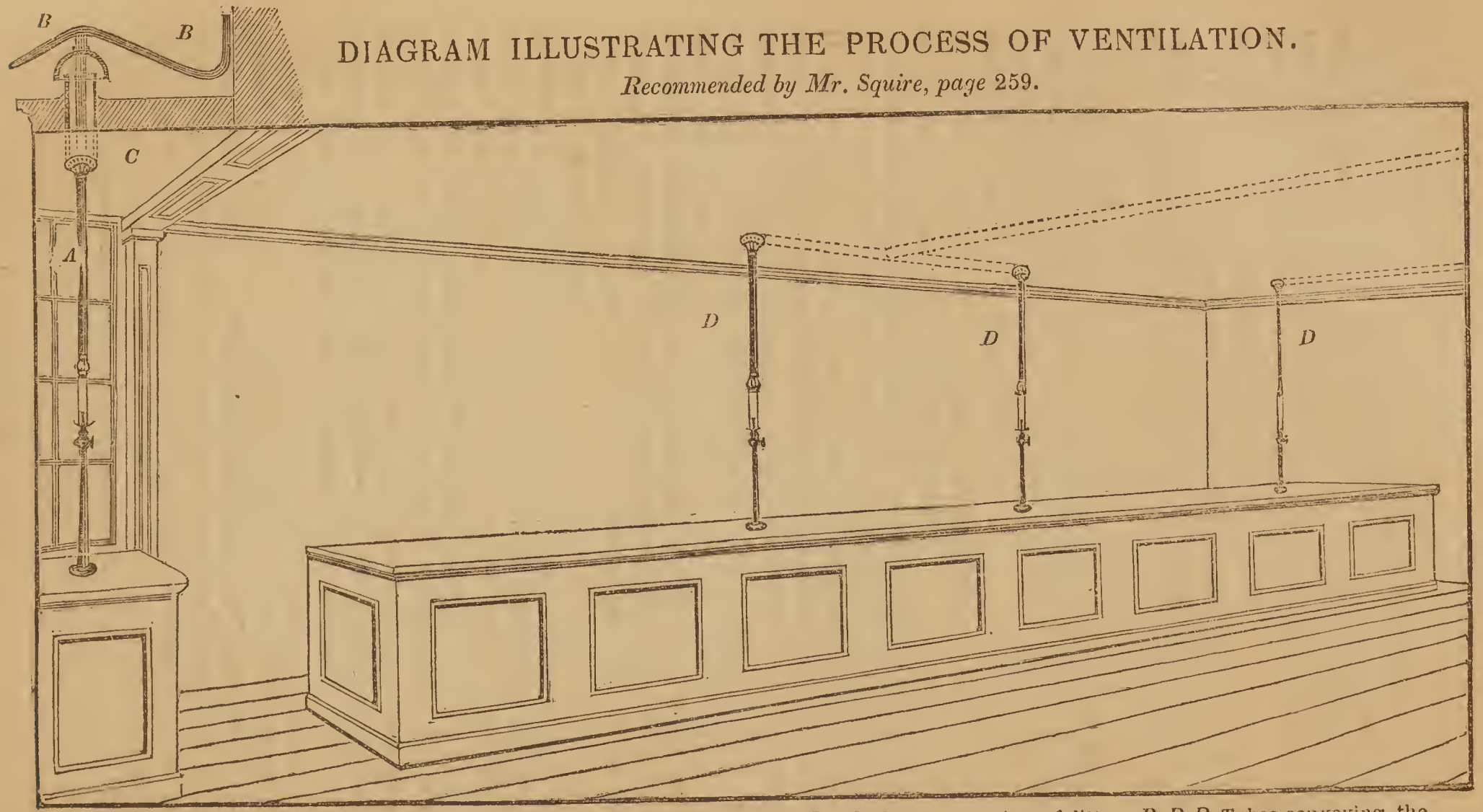
(On testing the mixture with oxalate of ammonia, it was found to contain in solution a considerable quantity of lime; but on adding acetic acid to the sediment, some effervescence was observed; showing that a portion of the chalk remained unaltered. The effervescence was very feeble on account of the viscous consistence of the mixture.)

Mr. Bell observed, that the two mixtures on the table had been prepared several weeks, during which time it was possible that further decomposition had ensued; but the gelatinization had taken place a day or two after they were made.

The Chairman stated, that the time having expired, it would be necessary to defer the reading of a short paper, which was on the table, relating to the electrotype process, which would afford the opportunity of elucidating it with some experiments at the next meeting on January the 13th.

DIAGRAM ILLUSTRATING THE PROCESS OF VENTILATION.

Recommended by Mr. Squire, page 259.



A, The Pipe conveying heated air to the open air, and finishing in a T piece, *B*. *C*, the outer casing of ditto. *D D D*, Tubes conveying the heated air between the joists to the chimney. The dotted line represents the outer iron casing for the double ventilation.

ON VENTILATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—There are two oversights in my paper "On Ventilation," *vide* vol. iv., page 263, line 14, *for* "four," *read* FIVE; line 17, *for* "inches," *read* FEET; and I may add a third, namely, the quantity of water formed by the combustion of five cubic feet of gas, which I find on calculation (viewing it as light carburetted hydrogen) is only 3339 grains, instead of 4375 grains = half a pint imperial.

The rough statements were merely to give general ideas as to the inconveniences and evils consequent upon inattention to proper ventilation. Mr. James Faraday states in his paper, read before the Institution of Civil Engineers, in June, 1843, that "a London Argand gas-lamp, in a closed shop-window, will produce in four hours, two pints and a half of water; which is much more than I have speculated upon in my paper, my trials with the No. 6 (the largest Argand burner in common use) seldom exceeding five cubic feet per hour.

The penultimate paragraph has been objected to on account of Messrs. Allen and Pepys estimating the oxygen consumed, and the carbonic acid given off, as equal; but Sir Humphrey Davy's results are very wide from this conclusion; the paragraph in question was taken from Dr. Reid's book "On Ventilation," page 17; and the foot-note relative to it is as follows: "This can only be taken as an approximation. The extreme diversity of the results obtained under different circumstances, shows that nothing can be expected to lead to a proper generalization, except a much more extensive and minute series of experiments than has hitherto been conducted."

I am, Sir, your obedient Servant, P. SQUIRE.

227, *Oxford Street, Dec.* 18*th*, 1844.

P.S.—In consequence of enquiries which have been made, a drawing is given on the other side, showing the mode of ventilating by means of gas.

ON A NEW PROCESS FOR THE PREPARATION OF LIQUID HYDRIODIC ACID.

BY RICHARD PHILLIPS, JUN.

WISHING to repeat the experiment made by Dumas of acting upon hydrated sesquioxide of iron by liquid hydriodic acid, I found considerable difficulty in preparing the acid of sufficient strength, by the usual methods, without its undergoing decomposition.

The process, I believe, generally adopted, is to pass a current of hydrosulphuric acid gas through iodine suspended in water, sulphur being precipitated, and hydriodic acid formed. The solution is then boiled, until all excess of the gas is got rid of, and the residue filtered.

It is, according to Berzelius, open to this objection, that on account of the iodine being but sparingly soluble in water, it is necessary continually to stir the solution, and that even if this precaution be taken, the iodine becomes so mixed with the precipitated sulphur as to remain unacted upon by the hydrosulphuric acid. To this I may add, that when the solution is boiled to get rid of the excess of the gas, or evaporated to increase its strength, by the decomposition of hydriodic acid when exposed to the action of the atmosphere, a small amount of iodine is set free, as shown by the blue colour given by starch to the solution.

In Professor Kane's *Elements of Chemistry*, it is stated, that if dilute sulphuric acid be added to a solution of iodide of barium, sulphate of barytes is precipitated, and hydriodic acid formed. The usual process, however, being to form iodide of barium by acting upon carbonate of barytes, or barytes water, by hydriodic acid, nothing is gained by the operation. It, however, occurred to me, that I might succeed by adopting the same principle, but varying the process. And my first experiment was to add to a solution of iodide of potassium in alcohol; hydrochloric acid, chloride of potassium, and hydriodic acid were formed, and the chloride being insoluble in the alcohol, was separated by filtration. This method, however, I conceived was objectionable, on account of the difficulty of adding exactly the right proportion of hydrochloric acid, and that from the hydriodic acid acting upon the alcohol, hydriodic ether might be formed. I therefore substituted zinc for the potassium, and oxalic acid for the hydrochloric acid, and these objections were removed. The following was the process: To 126 grains of iodine mixed with about one fluidounce of distilled water were added thirty-five grains of zinc turnings. The action was aided by a gentle heat (care being taken that the mixture was not exposed to atmospheric air), and when it had ceased, and no free iodine was found to be present, the residual zinc was washed, dried, and weighed. The solution and washings were then evaporated, and with them was mixed for every atom or thirty-two grains of zinc found to have been dissolved by the weight of the residual zinc, one atom or sixty-three grains of crystallized oxalic acid. The mixture was gently heated, and when cold, the precipitated oxalate of zinc was separated by filtration, and the hydriodic acid contained in the solution was found to contain neither oxalic acid, zinc, nor free iodine.

During the evaporation of the iodide of zinc, a slight precipitate takes place, and the solution becomes acid, resulting, as I have before shown, in the cases of the iodides and chlorides of iron, from water being decomposed, hydriodic acid being set free, and oxide of zinc precipitated. This, however, makes no difference in the accuracy of the process, as the oxalic acid would unite with the precipitated oxide of zinc.

In conclusion I may remark, that the advantages of this process would appear to be, that by ascertaining the amount of zinc dissolved, not the slightest difficulty arises in adding exactly the proper quantity of oxalic acid to precipitate it, and that from the evaporation of the iodide of zinc, previously to adding the oxalic acid, hydriodic acid of great strength is readily formed.

Craig's Court, December 17th, 1844.

CHEMICAL EXAMINATION OF RHUBARB ROOT.

BY DR. J. SCHLOSSBERGER AND DOEPPING.

(*Concluded from page* 236).

The *yellow crystalline granular substance* which separated several times from the ethereal solution of the resin, and which several chemists have described by various names (*rhëine, rheumine, rhabarbic acid, the yellow principle of rhubarb*), possessed, when pure, the following properties:—It is a beautiful clear, yellow, odourless, and tasteless substance, which separates in granular masses, and shows but little disposition to crystallize; it is not very soluble in ether, even when boiled, although it colours the fluid strongly; in cold water it is almost insoluble, more soluble in boiling water, which it dyes of a bright yellow colour; it is tolerably soluble in hot spirit of 80 per cent.; not very soluble in acetic acid and the dilute mineral acids; while it is dissolved, producing a beautiful red colour, by oil of vitriol, from which it is precipitated in the form of yellow flocculi on diluting with water; it is very soluble in alkalies, producing a beautiful red colour like red ink, and of such intensity that Brandes and Geiger have observed that this colouring matter forms one of the most delicate tests for alkalies. Concentrated nitric acid will dissolve it, assuming a yellow colour; and it undergoes a change if heated with this acid, as may be recognised by the alteration in colour, when the solution is saturated with ammonia. In contradiction to the statement of Jonas, we could not find that sugar augments the solubility of this substance in water: we consequently do not believe that an addition of sugar to the tincture of rhubarb, as he proposes, would be of advantage. If the combination of this yellow substance with potash be evaporated to dryness, the red colour changes to violet, and then to a beautiful blue, whilst an insoluble blue combination separates, which, however, returns to its original red colour on addition of water. Heated on a platina spoon, the greater part evaporates, emitting yellow fumes, which condense by cold to form yellow flocculi; but a quantity is also at the same time carbonized.

An alcoholic solution of sugar of lead, added to the solution of this substance in spirit, gave a white powder which disappears on being boiled with water, and gives way to a carmine gelatine, which is separated.

All these tests agree in a remarkable manner with those of a substance which has recently been discovered by Rochleder and Heldt in examining *lichens*, and forms one of the yellow colouring ingredients of the Parmelia parietina (Sprengel), Lichen parietina (Linn.), the well-known yellow lichen,

which covers the bark of the branches of trees so frequently. The chemists before mentioned have given to this yellow colouring matter whose properties are slightly acid, very properly the name of *Chrysophanic acid*, which is the more judicious, as it does not refer to the plant in which it was first discovered. Elementary analyses of the chrysophanic acid obtained from rhubarb, confirm the opinion we had formed from observation of its reaction, that it is identical with the chrysophanic acid of the lichens, as will be seen by comparison of the two analyses of the respective acids.

	Chrysophanic Acid of Rhubarb.	*Chrysophanic Acid of Parmelia parietina, according to Rochleder and Heldt.*	
	I.	II.	
Carbon	68.69	68.45	68.65
Hydrogen	4.24	4.56	4.59
Oxygen	27.07	26.99	26.76
	100.00	100.00	100.00

A second analysis failed as regarded the carbonic acid, but we obtained from 0.320 of the substance 0.130 water, corresponding with 4.51 per cent. of hydrogen.

Brandes and Leber published in 1839 an analysis of their rhabarbic acid, which, according to their description, is identical with our chrysophanic acid. Their results of the per-centage composition differs in a most remarkable manner—as regards the quantity of carbon, from our statement, which, on the other hand, perfectly corresponds with that of Rochleder and Heldt. Brandes obtained only 54 or 55 per cent. of carbon, and remarks that the substance burnt very readily with oxide of copper. We must assert the contrary, for we found it impossible to consume the highly carbonized substance with oxide of copper, unless we added chlorate of potash, because a portion was always sublimed and adhered to the upper part of the tube. We therefore always consumed it with chromate of lead (where the contrary is not mentioned), as we were warned by several analyses which gave too small a quantity of carbon, against the use of oxide of copper. Even if we admit that the rhabarbic acid analyzed by Brandes was strongly adulterated with resin, which is very probable, as he does not mention any process for purifying it, we are yet at a loss to account for the small quantity of carbon he obtained.

Rochleder and Heldt give for chrysophanic acid the formula $C_{10} H_8 O_3$, according to which it might be regarded as naphthaline plus O_3. As we found the same percentage composition, this formula, which of course merely indicates the relative number of atoms, remains the same for our acid. We could not determine the atomic number of the acid, from a scarcity of the substances (and Rochleder and Heldt failed in their experiments), for the quantity of acid we obtained from several pounds of different varieties of rhubarb was very small, on account of the frequent failures we experienced in preparing it. As regards the names rhëine, yellow principle of rhubarb, and rhabarbic acid, we must necessarily prefer that applied to it by Rochleder, especially as a few preliminary experiments seem to bear us out in the opinion that the same substance is to be found in the root of the Rheum rhaponticum, and Rumex obtusifolius (of Linn.; rad. lapathi of the shops).

Regarding the properties of chrysophanic acid, and more especially the intimate combination of its elements, we endeavoured to obtain it in a more direct way after the plan for obtaining alizarine, viz., by carbonizing powdered rhubarb with concentrated sulphuric acid, and thus endeavouring to isolate this substance, which resists even this powerful reagent. Haidlen had already made this experiment without publishing any result in the journals. Our results did not correspond with our anticipations. We obtained, indeed, by extracting the ash with spirit, and by distilling off the spirit, a considerable

quantity of this yellow substance, but it was mixed with a large quantity of erythroretine, which showed itself on evaporation, a mass of resin forming around the edge of the powder, and adhering along the edge of the watch-glass, so that we were obliged to have recourse to ether for separating it from the acid. *In the second place*, a chief difficulty was, to determine *à priori* the quantity of strong sulphuric acid necessary to carbonize the resins, &c., completely, and the experiments failed, inasmuch as we could obtain a considerable quantity of phæoretine and erythroretine from the ash when washed with water, but no chrysophanic acid. Whether the cause of this failure was the too powerful action of the sulphuric acid, as we suspect in the second experiment (where we observed a development of heat, ebullition, and a powerful odour of sulphurous acid), or an insufficient action, or other modifying causes unknown to us, we are not able to say.

A third attempt to obtain pure chrysophanic acid *by dry distillation*, was even less successful than the former; it was based on the partial sublimation of the acid, but after a quantity of water and yellow fumes (from the acid probably) had passed over, empyreumatic products were disengaged in such quantity that the product of distillation was less suited for the preparation of chrysophanic acid than raw rhubarb. The yellow portion of the product of distillation showed in many respects traces of impure chrysophanic acid, *e. g.* by its relation to the alkalies.

As a third plan by which we endeavoured to obtain chrysophanic acid from rhubarb in a easier manner, we mention *immediate* extraction with *ether* in Robiquet's displacement apparatus. The result was in this case not very encouraging, we certainly obtained, after several careful extractions with ether, a small quantity of granular chrysophanic acid; but it was of course mixed with erythroretine, which adhered obstinately to it. This method is, moreover, not very productive, expensive, and tedious, as all the rhubarb could scarcely be exhausted by ether.

II. *Examination of the portion of the spirituous extract of rhubarb soluble in water.*—That portion which is soluble in water, presents itself after filtration as a transparent brownish-red fluid, possessing the nauseating bitter taste and odour of rhubarb in a very marked degree. If an excess of sulphate of soda be added, a considerable quantity of *resin* separates, which is held in solution in the water by means of other substances, but we found it impossible to separate the resin completely by means of sulphate of soda, even if a great excess of the salt was added to the solution and shaken with it, for an addition of sulphuric acid still precipitated a flocculent deposit of resin from the solution. The resin precipitated by sulphate of soda did not differ in any property from the phæoretine we have described, excepting in retaining traces of chrysophanic acid and a resin soluble in ether (erythroretine). In the solution to which sulphate of soda had been added, chloride of iron produced a considerable black precipitate, which, as it presented itself even after a solution of gelatine had been added to separate all the *tannine*, indicated the presence of *gallic acid* as well as tannic acid. If the solution treated with sulphate of soda, and freed from the salt and the resin by filter, be treated with calcined magnesia evaporated to dryness, and concentrated alcohol be added, the spirit assumes a bright red colour, the solution is free from tannic and gallic acid, and leaves on evaporation a reddish-brown slightly bitter *extractive matter*, which has not the flavour of rhubarb, is readily and completely soluble in water, and deposits a quantity of protoxide of copper, distinguished by its red colour from a solution of peroxide of copper, on adding potash as long as the precipitate which is first produced is re-dissolved.

This re-action seemed to indicate the presence of *sugar*, which Meissner and Brandes had already discovered in rhubarb. To corroborate this hypothesis, a portion of the extract was dissolved in water and mixed with yeast;

when a lively fermentation and development of carbonic acid took place. The presence of sugar was an impediment to our examination of the extractive matter, for we were in no way able to separate it from the sugar. The decomposition of the sugar by fermentation would be very desirable if the yeast did not furnish fresh impurities.

Powdered rhubarb, exposed to a gentle heat with water and yeast, disengages a large quantity of carbonic acid, the whole mass being thrown into perceptible commotion during the escape of the gas. From this phenomenon alone some chemists have concluded that rhubarb contains sugar; but as, according to Larroques' discoveries, yeast, when in contact with tannic acid and water, decomposes the acid forming carbonic acid and other products, we believe that we must follow another course to prove the presence of sugar where the tannin will not form an impediment. We succeeded in this respect by digesting with magnesia usta, with which the tannic and gallic acids, together with the remaining resin, form a combination insoluble in spirit. If the solution containing the magnesia be evaporated, pulverized, treated with spirit, and the latter driven off by distillation, it is probable that *fatty matter* and *wax*, which are mentioned in several analyses, are present as extraneous substances in small quantity; but we had no opportunity of convincing ourselves of their presence; probably they are not present in all varieties of rhubarb; we analyzed the best specimens of Moscow rhubarb, given us by Professor Liebig, and Chinese root, from the shop of Dr. Mettenheimer.

We found, on the other hand, a considerable quantity of *fecula* and *pectine*; the large proportion of pectine which Henry obtained in his analysis of the root of Rheum australe, he considers dependent on the unfavourable climate in which it had grown (in France); but we obtained, even from the best varieties of rhubarb, considerable traces of jelly; certainly, judging from appearances alone, we should conclude that rhubarb contained a considerable quantity, but we are unable to calculate the proportions.

As the organic acid of rhubarb, mentioned in all analyses of the root, is destroyed by incineration, we endeavoured to obtain a combination before subjecting it to destructive distillation. The solution, neutralized with ammonia, gave a copious precipitate, which was filtered, washed, and digested in sulphuric acid; neutralized with ammonia (when a considerable quantity of *sulphate of lime* and some *oxalate of lime* were separated), the residue yielded, after repeated filtering, a copious precipitate, with a solution of sulphate magnesia. *Malic acid*, of which is stated to be one of the constituents of rhubarb, we could neither discover in the muriatic solution from which the oxalate of lime had been precipitated by ammonia, nor in the precipitate itself; nor could we detect it in the aqueous extract of rhubarb; so that we are inclined to consider its presence in rhubarb as accidental.

If rhubarb be decomposed by heat, it leaves a considerable quantity of ash, of which only a small portion is soluble in water. In the aqueous solution of the ash, when properly concentrated, *potash* and *soda* may be detected, the former by chloride of platinum, the latter by the blowpipe. The portion of ash insoluble in water was nearly totally dissolved with effervescence in dilute hydrochloric acid (leaving a little *silicon* and *sand*); according to the process described in Rose's *Analytical Chemistry*, traces of *peroxide of iron*, *phosphate of lime* and *magnesia* may be shown. Among the inorganic acids, we found in the ashes—*sulphuric acid*, *muriatic acid* (chlorine), *phosphoric acid*, and *carbonic acid*. We could discover no traces of peroxide of copper, which Buchner states he found.

As regards the physiological and practical importance of the separate substances obtained by us from rhubarb, we intend, hereafter, making experiments on man and animals. The notices we find in the literature on rhubarb, on this subject, appears to us so contradictory and superficial, that

fresh and more diversified experiments are quite necessary. Dulk and Geiger draw their conclusions of the activity of the rhëine they obtained from one single experiment. Geiger made his experiment on a bird, and Dulk observes, that two grains of his rhëine produced a copious evacuation thirty hours after it had been administered to a patient who suffered from constipation. In Brandes' experiment, six grains of pure rhëine administered to a man in perfect health, did not produce purging, but violent griping (!)

Thus much appears certain, that chrysophanic acid and erythroretine pass in an intact state into the vascular system, as the colouring matter of the rhubarb has been detected in the urine of patients who had taken rhubarb. Tiedemann and Gmelin have detected it also in the serum of the blood of animals to which rhubarb had been administered; and other less accredited experimenters state, that they have found it in the milk and perspiration.

In taking a retrospective view of the chief results of our analysis, we may make the following assertions:—

1. Rhubarb appears, as regards its chemical and therapeutic properties, to be a mixture of resins, extractive matter, and chrysophanic acid.

2. The chrysophanic acid of parmelia parietina is identical with the pure yellow crystalline substance obtained from rhubarb, which has been described in its impure state, under a variety of denominations by various authors—(as rhëine or rhababerine, by Geiger; the yellow principle of rhubarb, by Jonas; rhabarbic acid, by Brandes, &c.)

3. Resins are among the chief constituents of rhubarb, although their presence is denied, by Dulk; they are—by the intermediation of other substances of the so called extractive matter, &c., partially soluble in water. We have no guarantee for their absolute purity in the state in which we have described them, if we may not place some reliance on the fact, that we obtained the same percentage composition from resins prepared in different ways; a circumstance rendering it probable that they are more than mere mechanical mixtures of various substances.

The three chief resins are aporetine, phæoretine, and erythroretine; the two former appear isomeric, but all three are chiefly characterized by their different degrees of solubility.

4. The taste (odour) the relation to chemical reagents, and the therapeutic action of rhubarb, appear to be modified *essentially by the joint-cooperation of the resins, the colouring matter, and the extractive matter*; and probably also in a less degree by the tannin, gallic acid, sugar, pectine, and the copious salts of lime which it contains.—*Annalen der Chemie und Pharmacie*, Band i, Heft 2, May 1844.

ANALYSIS OF YELLOW CINCHONA (CHINA FLAVA*).

BY DR. C. STAHELIN AND T. HOFSTETTER.

The powdered bark was digested in ether, which extracted a small quantity of a *yellow transparent fatty matter*, and some traces of quinine, and was subsequently treated with alcohol.

Treatment with alcohol.—It formed a dark brown-red solution, this was evaporated to a clear concentrated fluid, and then water containing sulphuric acid was added; a red-brown precipitate fell from the solution, which was collected on a filter and well washed. The filtered solution contained proportionally a very large quantity of quinine, it was precipitated with carbonate of soda, and the precipitate, when washed with alcohol, consisted of pure quinine. The red-brown residue remaining on the filter was partially soluble

* In Germany, the term *China flava* is applied to the bark which is known in England by the name of *Carthagena Bark*.—Ed. Ph. Jour.

in ammonia, and yielded under this treatment an insoluble portion (*a*) and a solution (*b*),

a. The portion insoluble in ammonia.—A brown powder without taste or odour, insoluble in sulphuric and muriatic acids, slightly soluble in acetic acid, insoluble in water, soluble in boiling spirit. Not fusible, it burns with a bright flame, and leaves a large quantity of ashes. It was washed again with alcohol to purify it, and then analyzed, and gave—

	I.	II.
Carbon	64.68	65.24
Hydrogen	6.16	6.20
Oxygen	29.16	28.56

b. The ammonio-potash solution was precipitated with acetic acid, and the precipitate was dried, which was now only partially soluble in alcohol, consequently by this treatment it is separated into two parts, (*a*) the solution, (*β*) the residue.

(*a*). *The portion which is soluble in alcohol*, when evaporated, presents itself as a black shining mass, yielding a reddish-brown powder. It is no longer soluble in ammonia, insoluble in the mineral acids, slightly soluble in acetic acid, and insoluble in water, but perfectly soluble in boiling alcohol, yet not very readily. Its properties are those of the former substance (*a*), and its composition is the same.

Carbon	64.75	which would give the formula $C_{21}H_{12}O_7$ =	Carbon 65.21
Hydrogen	6.26		Hydrogen 6.13
Oxygen	28.99		Oxygen 28.66

(*β*). *The residue* is a brown-red powder, insoluble in alcohol, water, ether, and acids, soluble in alkalies, combustible but not fusible. A combination with lead was formed by precipitating the ammonio-potash solution with neutral acetate of lead. Analysis gave—

	Substance itself.	*Combination with Lead.*	
Carbon	62.55	18.57	corresponding with the formula $C_{20}H_8O_8$
Hydrogen	4.41	1.39	
Oxygen	33.04	10.18	

100 parts of the combination with lead contain—

	I.	II.	*Mean.*	
Oxide of lead	69.95	69.76	69.85	= Formula 4 Pb O
Substance	30.05	30.24	30.15	+ $C_{20}H_8O_8$

In the alcoholic solution we have, besides the organic bases, *two brown colouring substances* differing in their composition; the first = $C_{21}H_{12}O_7$, is formed, as may be deduced from its altered solubility in ammonia during the operation, from another substance, which we could not succeed in isolating; the second the *phlobaphene* (from *φλοιὸς, bark, βάφη, colouring matter*) $C_{20}H_8O_5$ is either likewise formed during the operation, or it owes its original solubility in alcohol to another substance.

Treatment with potash.—After having exhausted the bark with alcohol, it was treated with dilute solution of potash, and the brown-red fluid was precipitated with sulphuric acid. The precipitate had the same physical and chemical qualities as that obtained by potash from the bark of the Scotch fir, its composition was—

Carbon	59.35	corresponding with the formula $C_{20}H_8O_8$ + Aq.
Hydrogen	4.59	
Oxygen	36.06	

A combination with lead gave the formula 4 Pb O + $C_{20}H_8O_8$, corresponding with 69.77 oxide of lead, and 30.23 substance.—*Annalen der Chemie und Pharmacie*, Band li., Heft 1.

ON GUANO.

(British Association—Chemistry and Mineralogy).

This was a notice, by Mr. Warington, intended particularly to draw attention to the imperfect manner in which the estimation of the nitrogen in the analysis of guano, was given to the agriculturist. On the quantities of nitrogen depended, in a great degree, the value of a given sample, whereas in general the quantity of ammoniacal salts was only given. It appears, from the use of guano in the production of the prussiate of potash, that the quantities of this element are always understated.

A conversation ensued as to the relative value of the Peruvian and African guano. It was remarked, that in some cases it had been found, that the weight of the ear produced by the use of guano, was too great for the stalk to support ; consequently it fell, and the grain was injured ; and information as to a means of giving greater stiffness to the straw, was much to be desired.—Mr. Hunt stated, that it had been found in the west of Cornwall, that the use of the China stone, a decomposed granite, the felspar of which contained much silicate of potash, produced a straw of a very remarkable degree of stiffness.—Mr. Warington suggested that silicate of soda might be very readily formed at all places near the sea, by calcining together sea-sand and common salt. This led to a conversation on the power which plants possessed of substituting soda for potash in different districts.—Professor Liebig said he had been engaged in the analysis of plants growing in different districts extending from Giessen to the sea. It was found that corn, peas, beans, and grass, contained a larger portion of soda as they grew nearer and nearer the sea coast, thus satisfactorily proving, that plants could substitute soda for potash, without injury to their growth. No plants were found in which there was not potash, but there were many in which there was no soda. It had been asked, in what proportions soda and potash were found in the animal economy ? Soda existed largely in the bile and blood—potash was found most abundantly in the muscles, hence the reason was evident why the use of soda (common salt) with the food of man was universal. It was quite evident that plants could substitute one constituent for another—it had even been found, that in the tobacco plant lime had been replaced by potash.—In answer to other enquiries, Professor Liebig remarked, that the alkalies, in plants were not in combination as organic constituents ; they could be dissolved out. Carbon, on the contrary, formed a part of their structure. Carbonic acid was absorbed by plants, and served, uniting with hydrogen and with water, to form a series of compounds containing varying proportions of these elements. An organized body is formed by the action of chemical forces ; its structure shows it is not the result of physical force. We have the formation first of the vegetable acids of sugar, &c. ; oxalic acid, tartaric acid, and citric acid, were vehicles of transfer, combining as they did with the potash or soda of the plants, from which was at length separated the carbon, which went to the composition of the vegetable structure.

Sir John Johnson observed, that the value of guano was supposed to depend on the quantity of uric acid it contained : he begged to inquire if any experimental evidence existed as to the qualities of this acid as a stimulant or otherwise.—Professor Liebig stated, that there was not a single experiment on uric acid—that all which had been said as to its advantages, was mere assumption.—Dr. Tilley made some remarks on the fact, that the skin of the leg of a gull had been found by him in guano, the entire bone of the leg being dissolved out ; seal skin had also been found, but no bones.—Mr. Hunt stated, that of two cargoes of African guano which arrived at Falmouth, one entire cargo consisted of decomposed seals. In this he found the skin with the fur quite perfect, and a great number of bones far advanced in decomposition. It appeared, on inquiry in various quarters, that, half a century since, the seal fishery was carried on most extensively on that coast, the seals were all taken to the shore, the oil extracted, and

the remains thrown into large heaps—thus, on this particular spot, had accumulated those immense heaps, which they had been removing as the production of birds. Its value as manure was not less than that of true guano ; analysis giving very nearly the same results in the two samples examined by Mr. Hunt from these ships.—*Athenæum.*

ON THE COMPOSITION OF LINSEED OIL AND ITS PRODUCTS, BY OXIDATION.

BY DR. F. SACC.

The conclusions drawn by Dr. Sacc, from his experiments on linseed oil, are, that this substance consists of *margaric acid* and *oleic acid*, combined in equal equivalents with *acroleine*. By oxidation with nitric acid, we obtain margaric acid, oxalic acid, suberic acid, pimelinic acid, carbonic acid, and water.

The oleic acid of linseed oil differs in composition from the oleic acid of other fatty bodies ; the formula of the anhydrous acid is C_{46} H_{38} O_5. The margaric acid of linseed oil is identical with that of other fatty bodies, its composition being C_{34} H_{33} O_3. The glycerine, which is obtained in great quantity from linseed oil, is also similar to that procured from other fats.

By oxidation, the oleic acid yields suberic acid, which again is decomposed into a volatile fatty substance.

The pure margaric acid yields on oxidation succinic acid, but no suberic acid, or pimelinic acid.

The pimelinic acid is formed, by a transformation of the suberic acid, when succinic acid is present. There exists a peculiar fatty substance of very singular properties, forming the link between the oleic acid and the suberic acid.—*Annalen der Chemie und Pharmacie*, Band li., Heft 2.

ON THE VOLATILE OIL OF GARLIC.

BY THEODOR WERTHEIM.

By distillation with water, 1cwt, of garlic yielded between three and four ounces of a brownish yellow oil, which was heavier than water, and possessed the well-known odour of garlic. By careful re-distillation in a water-bath, this crude oil yielded about two-thirds of its weight of rectified oil, which is lighter than water.

Wertheim submitted this rectified oil to a very careful examination and analysis, and gives as its most simple formula C_6 H_5 S.

In pure oil of garlic (C_6 H_5 S) an equivalent of oxygen or chlorine may be substituted for the sulphur, or the oil can further be made to combine with metallic sulphurets, and these combinations possess the properties of sulphur salts. The group of C_6 H_5 therefore has all the characters of an organic base, for which I propose the name of *Allyl*=)*All*, and for pure garlic oil we should then have the name of *sulphurallyl* (Schwefelallyl) or *allylsulphur* (allylsulfur.)

Analysis of the various metallic salts gave the following formulæ :—

C_6 H_5 S =) All S, or *sulphurallyl.*

All S + Pt S_2, or *Platinsulphide—sulphurallyl.*

5 (All S) + 6 (Pt S_2), or $\frac{5}{6}$ *sulphurallyl—sulphuret of platinum.*

2 (All S) + 3 (Pt S_2), or $\frac{2}{3}$ *sulphurallyl—sulphuret of platinum.*

2 (All S) + 3 (Pd S), or *sulphuret of palladium—sulphurallyl.*

X (All S) + Ag S ?, or *sulphuret of silver—sulphurallyl.*

3 (All S + Pt S_2) + (All Cl + Pt Cl), or *double sulphochloruret with platinum.*

All S + 2 (Hg S) + All Cl + 2 (Hg Cl) or, *double sulphochloruret with mercury.*

(All O + Ag O) + N O_5, or *nitrate of silver—allyloxide.*

Annalen der Chemie und Pharmacie, Band li, Heft 3.

EXAMINATION OF THE RESIN OF WOOD JALAP, FROM THE *IPOMŒA ORIZABENSIS OF PELLETAN.*

A quantity of the root of the Ipomœa orizabensis was digested in alcohol, to the solution water was added, and the alcohol was distilled off. The resin thus obtained was washed with hot water, re-dissolved in spirit and decolorized by animal charcoal. The resin obtained on distilling off the spirit, when washed with hot water, evaporated over a water-bath and rubbed down, presented itself as a white powder, which was perfectly soluble in alcohol and ether, and formed a fluid as clear as water. It was soluble in an aqueous solution of potash and soda, and was dissolved by the alkaline carbonates on application of heat, and precipitated from the solution by muriatic acid, in the form of white flocculi. By concentrated sulphuric acid it is dissolved, assuming in about ten minutes a beautiful purple colour, and after the lapse of some time a brown viscid resin separates. Heated on a platina spoon it melts and burns with a bright flame, emitting some smoke, and leaves a porous coal which is at last totally consumed. It is tasteless and odourless, friable, and is readily reduced to powder. The dried resin obtained by evaporation from an alcoholic solution consisted of:—

	I.		II.
Carbon.....	58.58	.....	58.64
Hydrogen.....	8.01	.....	8.13
Oxygen	33.41	.....	33.23
	100.00		100.00

If we calculate a formula from this, assuming that this resin contains 42 equivalents of carbon, we obtain the following composition :—

		Calculated in 100 *parts.*	
42 equivalents	Carbon.....	3185.9	58.88
34 ,,	Hydrogen ...	424.3	7,84
18 ,,	Oxygen	1800.0	33.28
	Atomic weight	5410.2	100.00

which corresponds with the results obtained.

I propose for this resin the name of *Pararhodeorhetine*, as it produces the same reaction with concentrated sulphuric acid as rhodeoretine, to which it is in many respects analogous.—*Annalen der Chemie und Pharmacie.* Band li., Heft 1.

MODE OF DISTINGUISHING THE RESIN OF THE *IPOMŒA SCHIEDEANA*, AND THE RESIN OF STALK JALAP,

From other Resins met with in Commerce with which the former are sometimes adulterated.

BY DR. G. KAYSER.

THE relation of jalap resin to concentrated sulphuric acid, furnishes us with the means of testing these resins. We have only to moisten a little of the powdered resin in question with a few drops of concentrated sulphuric acid on a watch glass, and allow it to stand for a quarter of an hour. If it be pure jalap resin it will be gradually dissolved, assuming a beautiful crimson colour, and in a few hours a brown viscid resin will separate. I have tried the same experiment with common resin, with scammony and larch resins, with the resin of polyporus officinalis, with guaiacum, sandarac, mastic and olibanum, but none of these evinced this characteristic relation towards concentrated sulphuric acid, which is therefore an infallible test for jalap resin.

To distinguish the two resins of jalap met with in commerce, their relations to ether, as *Trommsdorff* observed, remains the best test.—*Annalen der Chemie und Pharmacie.* Band li. Heft 1.

DR. KAYSER'S CONCLUSIONS

ON THE RESULTS OBTAINED IN HIS ANALYSES OF THE RESINS OF TWO VARIETIES OF JALAP.

1. That the resin of the root of the Ipomœa schiedeana of Zuccarini, as Cadet de Gassicourt has already shown, consists of two distinct substances, *i.e.* of a fluid resin or fatty acid (?) soluble in ether, and of an electro-negative resin insoluble in ether.

2. That Buchner's and Herberger's jalapine is identical with my rhodeoretine, but does not possess basic properties as these chemists have asserted, being indeed a true resinous acid; for its solubility in nitric and acetic acids does not prove it to be of a basic nature as many other resins of decidedly electro-negative character possess the same property.

3. That the resin of the root of the Ipomœa orizabensis of Pelletan, is a simple resin, which, when purified perfectly with ether, yields a clear watery solution, and is therefore not identical with that obtained from the root of the Ipomœa schiedeana.

4. That rhodeoretine bears a similar relation to certain reagents as salicine, for it is converted by concentrated acids into sugar of grape and rhodeoretinic oil, and thus appears to be allied to the few but exceedingly interesting modes of decomposition of this kind.

Johnston appears to have been ignorant of the facts; first, that two sorts of jalap root as well as two varieties of resin obtained from them are met with in commerce, distinguished by their solubility or insolubility in ether. 2. That the pharmaceutic preparation of jalap resin always demands a perfect purification by means of hot water, as Cadet de Gassicourt prescribed in his treatise, consequently Cadet's results have been faithfully copied in Gmelin's Handbuch, which Johnston doubted. 3. That the latter examined the resin of the Ipomœa orizabensis of Pelletan. As regards the difference in his results when compared with mine, it would appear that Johnston analyzed an impure resin adulterated with colouring matter, whilst my resin was pure, free from colouring matter, nearly white, and gave with ether a solution as clear as water. Johnston consumed his resin with oxide of copper, which may perhaps account for his having obtained less carbon, for I could not succeed in effecting a perfect combustion of these resins with oxide of copper, and consequently always made use of chromate of lead.

ANOTHER FORMULA FOR UNFERMENTED BREAD.

BY MR. ALFRED BIRD.

(*From the Midland Counties' Herald.*)

After several careful trials, I find by this process, that twenty-one pounds of good flour produce thirty pounds of bread; this nearly agrees with the estimate of Pliny, who states that the bread should be one-third heavier than the flour which produced it. So large an increase will not take place if the bread be baked on the oven bottom. The great heat communicated to it so torrefies the outer crust, that considerable loss is occasioned thereby. The most economical way will be to bake the bread in tins.

PROCESS.

Flour 7lbs., or half a peck.
Sesqui-carbonate of soda, in powder, 1 oz.
Tartaric acid in powder, ¾ oz.
Common salt, ¼ oz.
Cold water, half a gallon.

Mix the sesqui-carbonate of soda, the tartaric acid, and common salt, intimately together in a very dry mortar ; if the mortar, or other vessel which may be used, is the least damp, the process will be injured. The whole is now to be stirred into the seven pounds of flour, by a circular motion with the hand, and constant stirring up from the bottom and all sides till the whole is thoroughly diffused through the flour ; it will take on an average about five minutes to blend them together. The tins should now be in readiness, and every thing so arranged that the dough may be put into the oven within five minutes after it is mixed with the cold water. The water should now be added in two or three portions, and the whole incorporated with the hand, the quicker the better ; and immediately afterwards send it to the oven. When mixed, the dough should not be so fluid as to pour out of the jowl into the tins, it should be sufficiently adhesive to put into the tins with the hands ; if it is intended to bake on the oven bottom, the bread must be stiffer, and less water should be used, but tins are the best. This quantity will fill three moderate sized tins, and will produce from seven pounds of flour, between ten and eleven pounds of good wholesome bread, which will keep good for a fortnight ; it should not be cut till it is two days old. It it very important that the sesqui-carbonate of soda be quite pure, as well as the tartaric acid. A great deal of the carbonate of soda in the market is contaminated with the sulphate, and the tartaric acid is very liable to adulteration with alum. This must be guarded against by purchasing them pure, or the process will fail.

15, *Worcester Street, Birmingham,*
November 18*th*, 1844.

MODE OF EXPELLING THE BLOOD FROM LEECHES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Among the various means used for emptying leeches of the blood they have drawn, I believe none will be found more simple and innoxious than to immerse them in a little mistura camphoræ for a few moments, when they readily vomit all the blood, and should then be put into clean water, which should again be changed in half an hour. In that disease, attended with a vomiting of dark coloured matter of which so many die, I have used it as a remedial agent, immersing them in it twice a week, and believe the mortality was much diminished in consequence. Yours respectfully, John P. Boyce.

Chertsey, Dec. 12, 1844.

REVIEWS.

1. Traité des Phénomènes Électro-Physiologiques des Animaux. Par C. Matteucci. *Suivi d'études Anatomiques sur le Système nerveux et sur l'Organe Electrique de la Torpille.* Par Paul Savi. *Paris*, 1844. 8vo. Pp. 342.

2. Rapport entre le Sens du Courant Électrique et les Contractions Musculaires dues à ce Courant. Par MM. Longet et Ch. Matteucci. (*Comptes Rendus de l'Académie des Sciences, du* 9 *Septembre*, 1844).

We are anxious to bring under the notice of the readers of the *Pharmaceutical Journal* the novel and important discoveries of

Matteucci, which are the more interesting since they establish a connexion between the physical and physiological sciences. The value and importance attached to them are sufficiently testified by the fact, that the Council of the Royal Society has considered them worthy of the Copley Medal.

We much regret that the confined limits of this journal compel us to restrict our notice to a brief sketch of some only of these researches. We shall of course select those topics which appear to us to possess the most general interest.

In the historical introduction to Matteucci's work we learn, that so far back as 1678, Swammerdam excited the contraction of muscles by galvanic agency. The form of apparatus which he used is not very clearly described; but the circuit consisted of copper, silver, and a nerve.

It is usually stated, that the frogs in which Galvani, in 1791, saw contractions excited by an electric current, had been prepared for making broth for the use of Madame Galvani, who was an invalid. But it appears that this statement is erroneous. Galvani had excited contractions in frogs, by what he calls *artificial* electricity, eleven years previously, namely, in 1780; and he had been occupied with experiments on the Hallerian irritability so early as 1772.

The most important instruments employed by Matteucci in electro-physiological researches, are the *galvanometer with the astatic needle*, and the *frog-galvanoscope*. The latter is the most sensible instrument known for detecting electrical currents. It is the skinned hind extremity of a vivacious frog placed in a glass tube, with the nerve hanging out of the end of the tube. It serves to detect not only the *existence* of feeble electric currents, but likewise their *direction*. If a current be passed through a small portion of the nerve, the limb is thrown into violent convulsions. When the frog is somewhat enfeebled, the convulsions take place only at the moment of closing the circuit, provided the current is a *direct one;* that is, if it traverse the nerve in the direction from the brain towards the distal extremity. But if the current be *an inverse one*, that is, from the distal extremity of the nerve towards the brain, the convulsions occur at the moment the circuit is broken, but not on closing it.

The most important of Matteucci's discoveries is that relating to the *muscular current*. He has proved that in the muscles of living or recently killed animals, an electric current is established, when the circuit is closed between the interior and the surface of a muscle. This current is found in mammals, birds, reptiles, and fishes; but it varies in intensity in different animals. It ceases sometime after death, and is always directed, in the muscle, from the interior to the surface; or, to speak more

generally, from the interior of a muscle to any conducting body which communicates with its surface. Thus, if we cut the muscles of a living or recently killed animal (as the pectoral muscle of a bird, or the thigh muscles of a frog) and introduce into the bottom of the wound the extremity of the nerve of the frog galvanoscope, and, with another portion of the nerve, at the same time also touch the surface of the muscle, the frog galvanoscope instantly indicates the existence of a current, by the convulsions which occur in the limb.

A *frog-battery*, or *frog-pile*, may be constructed with the halves of the thighs of frogs. The halves are prepared thus: separate the thigh from the leg at the knee-joint; then cut, transversely, through the muscles and bone of the thigh at its middle. In this way we obtain a conical mass. A series of twelve or fourteen of these masses, placed in contact, the smaller or knee end of one piece being applied to the cut end of the muscles of the next piece, forms the pile. The current passes from the interior to the surface of each half-thigh, and from the surface, or knee end, of the one half-thigh to the cut muscles of the next half. A pile of this kind causes very distinct deflections of the galvanometer.

What is the origin of the muscular current? As the signs of the current cease soon after death, we may conclude that organic structure is necessary to the effect. But it is equally certain that the integrity or perfection of the nervous system is not essential, since the effect is produced after the brain, spinal cord, and nerves are removed. Matteucci, therefore, infers that the electricity is generated by the nutrition of the muscles; and that the nervous system is only indirectly useful, partly by acting as an imperfect conductor, but principally by influencing nutrition.

In the frog, Matteucci has discovered another electric current, nothing analogous to which can be detected in other animals. He, therefore, terms it, the *peculiar current of the frog* (*courant propre de la grenouille*). This current always proceeds from the feet towards the head. The origin and nature of this current has not yet been made out. It can scarcely be either a *thermo-electric* or an *electro-chemical* current.

It appears, that *when the muscles contract an electric discharge takes place.* In no other way can we account for some of the phenomena observed by Matteucci, than by assuming the existence of this discharge. If the nerve of a prepared frog's leg be laid on the thigh muscles of a second frog, the muscles of the first leg contract, when those of the second frog are convulsed; but if a plate of gold be placed between the nerve and the muscles, the effect is not observed; the electricity being carried off by the metal.

Longet and Matteucci have recently established a very curious fact with respect to the effect of an electric current on the nerves, in the second period, or when they have become somewhat less susceptible of the electric influence. In the *mixed* nerves contraction is induced *at the commencement of the direct current, and at the interruption of the inverse current:* but in the *motor* nerves the reverse holds good; the contraction is produced *at the commencement of the inverse current, and at the interruption of the direct current.*

These are some of the important and interesting subjects noticed by Matteucci, to whose work we must refer our readers for further details.

Experimental Researches in Electricity. By M. Faraday, D.C.L., F.R.S., &c. &c. *Reprinted from the Philosophical Transactions of* 1838-1843; *with other Electrical Papers from the Quarterly Journal of Science and Philosophical Magazine.* Vol. II. *London: R. & J. E. Taylor.* 1844. 8vo, pp. 302.

In 1839, Mr. Faraday collected in one volume the very valuable fourteen series of his *Experimental Researches in Electricity*, which had appeared in the *Philosophical Transactions*, between the years 1831-1838. To these he added foot-notes and a very copious index.

The present volume contains the four remaining series of *Researches*, which have been subsequently published; together with various interesting papers which Mr. Faraday has contributed to different journals. This volume, like its predecessor, is enriched with additional notes and an excellent index.

The papers contained in it having been now published for some years, and notices, more or less lengthy, of them having appeared in every scientific journal in this and other countries, as well as in all recently published works on electricity, we think it unnecessary to enter into details respecting them; and shall content ourselves with recommending this volume, as well as its predecessor, to those of our readers who are interested in the progress of electrical science. Although all the papers are exceedingly important and valuable, it strikes us that those on the electricity evolved by the friction of water and steam against other bodies, and which constitute the eighteenth series of his *Researches* in the *Philosophical Transactions*, stand pre-eminent in interest and value.

RECENT IMPROVEMENTS IN ARTS, MANUFACTURES, AND MINES; *being a Supplement to his Dictionary*. By ANDREW URE, M.D., F.R.S., &c. &c. 8vo, pp. 294. *London: Longman and Co.*

WE are acquainted with no author who is more qualified to give valuable and practical information on this subject than Dr. URE, whose DICTIONARY OF ARTS AND MANUFACTURES is well known and appreciated both in this country and abroad. The only work of the kind which will bear comparison with it is *Aikin's Dictionary*, which enjoyed a similar celebrity in its day. But so great and rapid has been the advancement of art and science within the last few years, that Dr. Ure has found it necessary to make some very important additions to his Dictionary, in order that the work may keep pace with the times. Instead of bringing out a new edition, and thus obliging all his former subscribers, for the sake of the new matter, to repurchase the work, he has produced the SUPPLEMENT, which places all the recent discoveries within reach of his readers at a moderate cost. The Dictionary having had an extensive circulation, the Supplement cannot fail to have the same—or even a larger, as it is a desirable work for those who do not possess the Dictionary, some of whom may be induced to purchase both.

The Supplement contains many useful articles, illustrated with wood-cuts, among which we may notice those on artesian wells, bread, brewing, the adulteration of many articles of food, fermentation, gas-light, guano, iron and other metals, spirits, sugar, ventilation, alkalimetry, &c. The following paragraph from the preface is a good specimen of the style of the author, and gives evidence of practical experience and observation:

"When the duty on an article is more than ten times its intrinsic value, it must become the subject of perpetual and enormous frauds, and engender innumerable misdemeanors and crimes. Towards the prevention and punishment of these transgressions of the fiscal laws, a cumbrous, complex, costly, somewhat arbitrary and despotic system of espionage and prosecution must be organized. The working of this vast machinery is well shown in the Committee's Report, and must excite uncomfortable feelings in every honourable mind. We here see, on a somewhat magnified scale, the system of interference with, and prying into, processes of art and manufacture which accompanies and characterises all the operations of the excise. This device for collecting revenue for the necessities of the State, is the Pandora's box of the dethroned Stuarts, and should have been expatriated with that ill-starred family. We may say of it, *Quicquid tangit, deornat.* No branch of industry can acquire its due development under its wiry training and fastening. Had the *incubus* of the excise overlaid our textile manufactures of wool, cotton, flax and silk, how dwarfish would their stature have remained, and how meanly would they have quailed under the unrestrained labour of rival nations; whereas now they afford employment, with food, raiment, and lodging to millions of our people. For the manufacture of glass in all its useful and ornamental branches, this country possesses indigenous resources superior to those of every other one, in its stores of

fuel and vitrifiable materials of every kind, and yet it is surpassed by France, Switzerland and Bavaria, in glass for optical purposes, and by Bohemia in the quality and execution of decorative glass. Our scientific chemists have been obliged to get all their best glass apparatus from Germany, *via* Hamburgh.

"Surely, our glass-makers are the same race of people as our manufacturers of iron, fine cotton yarn, muslin, bobbin-net, broad silks, &c., which defy the competition of the world; and, if unshackled by the excise, they would ere long turn the scale against their foreign rivals, now their superiors. The incessant and vexatious espionage of the excise is a bar to all invention in every art under its control."

These comments, though forcible, are rather severe, and we should have been glad if the author had confined his cutting remarks to subjects like the excise laws, which, being particularly tough, require sharp treatment, and may be handled accordingly, without injury to individuals. We very much regret, however, to observe, that Dr. Ure does not confine his asperity to public matters, but handles some of his professional brethren in a similar manner. This is the only feature in the book which makes the duty of reviewing it an unpleasant one, as we should fail in the performance of that duty if we were to shrink from a candid expression of opinion on the subject. It is greatly to be lamented, that controversies of a personal nature ever find their way into scientific works, and by creating unpleasant feelings on both sides, prevent that harmonious association among men of science, which is so desirable to their mutual friends.

A Treatise on Poisons, *in relation to Medical Jurisprudence, Physiology, and the practice of Physic.* By Robert Christison, M.D., F.R.S.E., &c. &c. Fourth Edition. *Edinburgh: Adam and Charles Black. London: Longman and Co.* 8vo, pp. 987.

This work is considerably enlarged and improved, but we could not do justice to it this month, and therefore defer the notice of it until our next number.

Principles of Forensic Medicine. Part III.—Toxicology. By William A. Guy, M.B. *Cantab.*; *Fellow of the Royal College of Physicians; Professor of Forensic Medicine, King's College, London, &c. Henry Renshaw*, 356, *Strand.* Small 8vo, pp. 176.

Dr. Guy's work on the *Principles of Forensic Medicine*, has been published in three separate parts, of which this is the last. The two previously published parts treated of "*Medical evidence, Personal identity, Age, Sex, Impotence, Rape, Pregnancy, Delivery, Fœticide. Infanticide, Legitimacy, Life Assurance, Feigned diseases, Unsoundness of mind, Persons found dead,*

Real and apparent death, Sudden death, Survivorship, Wounds, Death from asphyxia, Drowning, Hanging, Strangulation, Suffocation, Lightning, Cold, Starvation." The present part, which completes the work, is confined to the subject of Toxicology. We gave a favourable notice a short time ago, of a work somewhat similar to Dr. Guy's in extent and design, entitled *A Manual of Medical Jurisprudence*, by Alfred S. Taylor, and we see no reason for making less favourable mention of the little volume now before us. It has been imputed to Dr. Guy, by a recent reviewer, that he has unfairly borrowed from Mr. Taylor's work, without making proper acknowledgement; but after perusing what has appeared in the journals on this subject, as well as the works themselves, we must confess that the reviewer appears to us to be rather hypercritical.

The question appears to be this: Had Dr. Guy a right to publish a work on the subject at all, Mr. Taylor having already published one? If not. by what right did Mr. Taylor publish his work, while that of Dr. Christison was in the field? If it be granted that the field is open to all, whose property are the *facts*, without which no work on the subject would be complete? But Dr. Guy is accused of having been a pupil of Mr. Taylor, and then making use of the information. Mr. Taylor would have had more cause to feel hurt, if his pupil had found nothing worth mentioning in his lectures. Admitting the accusation to be, to a certain extent, well founded, the rays of the sun are not less bright because they are borrowed by the moon; and, if a cloud were to intercept those rays, the world would give the sun less credit. The reviewer is Mr. Taylor's cloud, and Dr. Guy his moon. But, in many points, the two works in question are dissimilar, and we hope they will both continue to illumine the world with their rays, whether borrowed or intrinsic.

Dr. Guy has treated the subject of Toxicology in a concise, yet clear and perfectly intelligible manner, and to those who may desire to study Toxicology, independently of the other branches of medical jurisprudence, the separate publication of this branch of the subject, in a cheap form, will be a recommendation.

AN ADDRESS OF THE SOCIETY OF APOTHECARIES *to the General Practitioners of England and Wales, on the Provisions of the* BILL "*for the better Regulation of Medical Practice throughout the United Kingdom,*" *and their probable influence on the position and prospects of that branch of the Medical Profession. London: S. Highley.* 8vo, pp. 55.

IN this pamphlet, the several clauses in Sir James Graham's Bill are separately analyzed, or, more properly speaking, cut up, and the Society come to the conclusion, that, if the Bill should

be persisted in, it will be their duty "to urge upon the Legislature the views which they entertain, in common with their professional brethren, of its mischievous and dangerous tendency; and they pledge themselves to leave no effort untried to prevent the Bill becoming law." The Chemists and Druggists being only indirectly alluded to in the pamphlet, we have no further remarks to make on it, and therefore proceed to notice the

MANIFESTO *of the Medical and Surgical Association of Marylebone.* 8vo, pp. 16. *Churchill.*

WE fully concur in many of the sentiments contained in this pamphlet, and are glad to see that it evinces a disposition to promote a *mutual accommodation* between the several parties concerned in the weighty question of Medical Reform. At the same time it must be considered as emanating from a party—namely, the General Practitioners, who very naturally lean towards their own particular views, while they endeavour to reconcile these to the requirements of the other branches of the profession. The first clause states,

"That Medicine and Surgery are the same profession,—depending upon the same principles, as a science they are essentially one and indivisible—and that, in the present state of medical practice, this truth should constitute the basis of all Medical Reform."

This notion was never called in question from the time of Hippocrates to that of Henry the Eighth. Prior to the sixteenth century, the whole profession consisted of General Practitioners.

"CLAUSE XIV.—That the Chemists and Druggists are, for the most part, men of some education, familiar with every article of the Materia Medica, and like the less informed of the old Apothecaries, possessed of a limited knowledge of the virtues of medicines. They have recently become a body corporate; they exhibit Diplomas in their windows. But the carrying on the business of a Chemist and Druggist gives no qualification;—the Diploma of the Pharmaceutical Society is no guarantee of a professional education, nor is it a licence to practise,—and such persons, acting as apothecaries or medical practitioners, in the present state of the law, are liable to heavy penalties."

We are aware that the diploma of the Society "is no guarantee of a professional education;" but it is a guarantee that the possessor has either passed an examination, or has been in business as many years as have elapsed since the society was formed; and *every succeeding year will increase its value as a test of qualification.*

"CLAUSE XV.—That if there were no restrictions to these gentlemen practising medicine, they would be called upon generally, and under every variety of circumstance, not only to prescribe for, but to visit the sick, and there would be no impediment to their assuming the position and even the name of the former apothecary."

This is what the Chemists, as a body, do not desire, nor would they be gainers by the transformation from qualified and respectable Pharmaceutists to unqualified visiting Apothecaries.

"CLAUSE XVIII.—That it would be neither just nor expedient to prevent Chemists and Druggists giving their opinions respecting drugs generally, over their counters, or directions as to the use of the safer remedies. At present, the more conscientious individuals confine their advice within these limits. Others exceed these, but with the penal clauses of the existing Apothecaries' Act before them, they do so surreptitiously, cautiously, and, as compared with their opportunities, they do so as a body, partially and infrequently."

Comparing this clause with the principles of the Act of Parliament, which created so much sensation about four years ago, it is obvious that a reaction favourable to our body has taken place during the interval; which is a satisfactory demonstration of the policy of the course the Pharmaceutical Society has adopted on this subject.

"CLAUSE XIX.—That if it be asked whether a mother ought to be prevented giving a little rhubarb or magnesia 'to quiet an infant's stomach ache'—an old nurse to practise midwifery—or a clergyman residing in a district remote from competent medical assistance to use his best judgment for the relief under suffering of his poorer brethren ?—the answer is, Certainly not. An observing mother is a better interpreter of her infant's physiognomy, gestures, and cries, than any uneducated medical practitioner. It is quite a different thing for women, who, for the most part have had families, to assist in a process of nature in their own sex, and for men to undertake such a duty without having received a professional education ; such persons should however be restricted from the use of 'virulent poisons' and powerful agents like *secale cornutum*, and it should be rendered penal for any but qualified medical practitioners to resort to instrumental delivery. The administration of simple remedies, from christian, or purely philanthropic motives, need never be confounded with the practice of physic for pecuniary gain."

"CLAUSE XX.—That there is a large class of medicinal substances, properly called 'virulent poisons,' which being employed judiciously by properly educated and experienced practitioners, are powerful remedies against some of the most painful and fatal diseases, but which, if administered in over-doses, or in safe doses at improper periods, or in maladies for the relief of which they are not calculated, or if injudiciously compounded, and otherwise—instead of relieving human misery and preserving life, are calculated in a fearful degree to aggravate and complicate disease, and to increase the sum of mortality ; and that no individual in the community, except a qualified medical man, ought to be allowed to prescribe, administer, or advise the use of any such substance, for pecuniary gain, under the plea of relieving or curing diseases, or under any other plea whatever."

This clause appears to be intended as a rider to Clause XVIII. If all the "poisons" be taken from the Materia Medica, how many articles would be left?

"CLAUSE XXV. * * * * * The mode also of conducting practice calls for reformation. The general practitioner has been slow in discarding the objectionable methods of the apothecaries of old, but the fault has not been entirely his own. It has rested, and still rests with the public. The prejudice has been too deeply rooted in the public mind, that the professional man ought to give a material *quid pro quo* in the shape of physic for money. Hence, the amount of medicine supplied has been taken as the measure of remuneration. According to this system, sometimes the profession, sometimes the public, has been the gainer as far as money is concerned ; but the profession has been the loser in respectability ; and

science and the public have lost in the misapplication of time and talents which ought to have been better employed."

This is a very important clause, as it refers to a subject upon which a mutual arrangement might advantageously be made between the General Practitioners and the Chemists.

"CLAUSE XXVI.—By the foregoing it is not intended to imply, that it is either derogatory to the general practitioner or injurious to the public, for the former to supply his own medicines. The custom is attended with many advantages, provided the practice of remunerating in proportion to the quantity of medicine furnished were abolished."

We quite agree in the opinion, that in many, cases, it is convenient and desirable for medical men to send the medicine to their patients, and consider the abolition of this practice by Act of Parliament, as recommended by some persons, altogether impracticable. Each practitioner must be at liberty to use his own discretion on the subject; but the remuneration for medical advice should be kept perfectly distinct from the charge for medicine.

"CLAUSE XXXII.—That manifestly, nothing would so effectually secure the public interests as the establishment of

A COLLEGE OF GENERAL PRACTITIONERS IN MEDICINE, SURGERY, AND MIDWIFERY;

and therefore, that the further object should be to obtain a Charter of Incorporation, and a new Act of Parliament, or a modification of some existing Act, giving an elective Council, and Court of Examiners, with power to frame by-laws, and to examine and license all future general practitioners."

We cannot quite understand the advantage to be derived from this College. The progress of science has led to the classification of the profession into three grand divisions, MEDICINE, SURGERY, and PHARMACY, represented by the three classes, PHYSICIANS, SURGEONS, and PHARMACEUTICAL CHEMISTS. General Practitioners are not a new or distinct class, but a combination of the whole, and representatives of the medical profession in ancient times, before any division was thought of. We should think that the division having been made, it might be optional with each individual whether he holds only one diploma or more, and that this arrangement would be more in accordance with the progress of science than the one proposed, which appears like a retrograde movement. There might be in each of the three divisions a minor examination for qualification to practise, and a more severe examination for a degree. Thus each practitioner would find his level, according to talent, industry, and choice of department. But we have no wish to say any thing against the establishment of the proposed College, or to interfere in any way with the arrangements of other bodies. We merely glance at the subject, in order to illustrate our ideas respecting the natural and convenient division of labour, and the position of Pharmacy in relation to the other branches of the profession.

TO CORRESPONDENTS.

Several Correspondents have suggested that the subjects of the papers to be read at each Pharmaceutical Meeting should be mentioned previously in the Journal, as an inducement for Members to attend. [This could not be done regularly, as it frequently happens that the papers are received after the Journal is printed. We would suggest as an amendment, that if the Members generally would make a practice of attending, they would always find a good meeting. We have sometimes had very interesting papers and a small meeting, but have never been present at a meeting at which there was not something to be learnt. Having attended every meeting from the commencement, we speak from experience.]

"A Member" suggests that the Society might with advantage supply the Members with the pharmaceutical preparations in the highest perfection. [The Society was not constituted as a trading body, and we think it would not be desirable to enter into competition with Apothecaries' Hall. We shall do more good by teaching our Members how to make the preparations in the best manner, than by opening a shop.]

R. M. M. regrets that the Lectures on Practical Pharmacy cannot be published in the Journal, and thinks, that if brought out separately, they would be much appreciated. [We think it likely that Mr. Redwood will shortly publish the substance of his lectures.]

Mr. Anderson informs us that in preparing the tinctura ferri sesquichloridi he found the sesquioxide of iron adulterated with iodine. [The only way in which we can account for the presence of iodine is, by supposing that the oxide of iron had been obtained in the Pharmacopœia process for making iodide of potassium. Our Correspondent does not state whether he determined the presence of iodine by the usual chemical tests.] Mr. Anderson also wishes the lectures could be published in the Journal instead of the subscription being reduced.

Mr. Davis thinks that if the subscription be reduced, the balance should voluntarily be given to the Benevolent Fund.

X. Y. Z. thinks the reduction in the subscription will greatly increase the number of subscribers; but suggests that the Journal should not be given to the Members and Associates, and that the amount incurred by its distribution should be given to the Benevolent Fund, the purchase of the Journal being optional with each individual. — X. Y. Z. also wishes the lectures to be published in the Journal.

Mr. Tite thinks the Journal ought to be considerably enlarged, and the original subscription should be continued. He thinks this would extend the usefulness of the Society, and satisfy those who have advocated the reduction.

Several Correspondents have complained that the admission of new Members on the reduced terms is an injustice to those who have subscribed from the beginning. [The original Members of the Society are interested in maintaining its continued prosperity. It is for them to consider by what course this is most likely to be effected. This has been very seriously considered by the Members at large, who have earnestly appealed to the Council in favour of the reduction, as being in their opinion desirable, and likely to benefit the Society. This being the general opinion, it was policy to act upon it, and we trust the result will prove that the Council have done right in attending to the wishes of their constituents.]

J. M. H. has enclosed a violent article against the Chemists and Druggists, from the *Somerset County Gazette*, wishing us to answer it. [We never think it worth while to answer violent articles. The overflow of *bile* is generally accompanied with debility, and no one suffers from it except the patient, if other people keep at a respectful distance.]

R. C. S.—The composition of bronze differs according to the purpose for which it is intended. For cannon 90 parts of copper and 10 of tin; for medals, 9 of tin, 89 of copper, and 2 of zinc.

T. L. R.—(1). We believe the bark of the stem of mezereon is too generally sold instead of the bark of the root. The latter is ordered in the Pharmacopœia, and it is rather stronger than the former.—(2). We have frequently seen large logs of wood which had been sold as sassafras root. The essential oil resides chiefly in the root, the wood being almost inert.

"Δ" When "aquæ menthæ ℔ss." is ordered in a prescription, does the prescriber mean six, eight, or ten ounces?

[The term ℔ss., according to the Pharmacopœia, denotes six ounces troy We are aware, however, that it is frequently adopted in prescriptions to designate the old half-pint or eight ounces. It is impossible for us to dive into the intentions of each prescriber. In any case in which a misinterpretation might be attended with serious consequences, it would be proper to call and ask the question.]

"Pharmacien" (Stirling).—For a very good description of the process for preparing iodine, see *Graham's Chemistry*.

A. P. S. (Edinburgh).—(1.) states that he has prepared marking ink according to Mr. Rowland's formula, and finds the colour very good, but the texture of the cloth destroyed by it. [This is sometimes the case, when excess of nitrate of silver is used: probably the ink was too much concentrated.]—(2.) Sir James Graham's proposed Medical Bill was published in the *Lancet* of Aug. 17, 1844.

"Hyoscyamus."—The natural system. See Lindley's *Elements of Botany* and *Natural System*.

"An Observer."—(1.) No harm could arise from making barley water with Robinson's patent barley.—(2.) We have seen no recognised formula for Haustus Rhei. — (3.) Ung. hyd. nit. oxid. is sometimes sold under the name of Golden Ointment.—(4.) The dose of jalapine is from two to five grains.—(5) Jalapine may be made by decomposing the alcoholic solution of jalap resin with acetate of lead, filtering the solution, and getting rid of the acetic acid and excess of lead. We have not space to give the details of the process.

A. B. C., M. P. S., wishes to know the best method of preventing decomposition in the concentrated decoction of sarsaparilla, as he has found spirit to occasion a deposit. [We are not acquainted with any substance, except spirit, which can be added for this purpose without altering the character of the preparation. It has been stated (*see* vol. ii., p. 250), that diluted alcohol is the best menstruum for the active principle of sarsaparilla.]

E. B.—We intend to prepare a short notice of the samples of bark and senna, either for the Pharmaceutical Meeting, January 8th, or for our next number. E. B. should inquire for the Curator at the Museum, when he wishes to examine any of the specimens.

Mr. Cooper has forwarded to us the prospectus of a Pharmacological Society, lately established at Reading; the object of which is the advancement of Pharmacy, by the formation of a museum of Materia Medica, &c., and the delivery of a lecture every Friday evening. The subscription is four shillings per annum.

"Paris" should have been answered last month, but we are in possession of no definite information on the subject.

"Omicron."—(1) Scented powder for bags is made with calamus aromaticus, lavender flowers, rose leaves, gum benzoin, styrax, cassia buds, cloves, cinnamon, musk, orris root, &c., cut or bruised sufficiently fine. The proportions regulated according to taste. A little otto of roses and a few other essential oils are sometimes added.—(2) Essence of musk is made by macerating musk in spirit. The proportions are arbitrary.

"Amicus."—For information respecting the course of study requisite to pass the Apothecaries' Hall, apply at the Hall, or to Dr. Steggall, Southampton Street, Bloomsbury.

W. W. K.—We had intended to publish a few formulæ for currie powder this month, but accidentally forgot it until too late.

"PHARMACIEN" (Kingston.)—(1.) There is no law to prevent an Associate of the society practising as a Veterinary Surgeon, if properly qualified; but this would be a departure from the department of a Pharmaceutical Chemist.—(2.) Any person may attend the lectures at the Veterinary College by paying the fees; but no person could be admitted to pass the examination unless he had been apprenticed to a Veterinary Surgeon.—(3.) For the course of study apply at the College.—(4.) Two sessions.

MR. SQUAREY.—A patent was granted to William Newton, Chancery Lane, London, in June, 1839, for combining preparations of iron with farinaceous substances, to be administered in the form of biscuits or cakes, in cases of debility or chlorosis. We presume this is the compound alluded to, but do not know where this "*iron bread*" is made. We believe no precise formula is given in the specification of the patent.

"A MEMBER."—(1.) Hartshorn and oil, made with oil of almonds, will remain fluid during cold weather.—(2.) A good red colour for a street-lamp, that will not congeal in frosty weather, may be made with oil of turpentine and alkanet root.

"AN APPRENTICE" and J. B., A.P.S., wish for a better formula for *blue ink* than that given in this Journal a few months ago. [The principal difficulty in making this ink, arises from the impurity of the ordinary Prussian blue of commerce. We find that a good blue ink may be made by mixing solutions of oxalate of iron and prussiate of potash, and propose giving the formula in this Journal, as soon as our experiments are completed.]

JUVENIS WILLIAM ARCHER.—(1.) Copal may be dissolved in strong spirit, if a little camphor be added, and the mixture boiled, It may also be dissolved in essential oils, such as oil of lavender, and this afterwards added to spirit.—(2.) Scouring drops, similar to Smyth's, may be made by mixing distilled essence of lemons with alcohol and a little camphor.

"JUVENIS."—We recommend *Fownes's Manual of Chemistry*.

T. N. S. (Reading) wishes to obtain the address of Mr. Drayton, the patentee of the new silvering process for glass.

H. C. informs us that his letter, of which we published an extract last month (*On Free Trade, &c.*, signed W. C., by mistake), was not intended for publication. Another Correspondent was surprised to see his letter in print.

(We take this opportunity of making a remark on anonymous letters. It is very desirable that all letters should have the names of the authors attached, either confidentially or otherwise. We never insert a name when requested to withhold it (except in one case, in which the request was received after the *Journal* was printed); and in some cases we should be glad to communicate with the authors by letter. When facts are stated which require attestation, we cannot publish them without knowing who is the author; and we never publish anonymous letters unless they happen to contain sentiments which we think it desirable to promulgate, or which require some explanation).

We regret that we are obliged to defer Messrs. Smiths' paper on Sulphate of Iron, combined with an alkaline carbonate, as an antidote for prussic acid.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to THE EDITOR, 338, Oxford Street, before the 20th of the month.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. VIII.—FEBRUARY 1st, 1845.

ON THE SALE OF POISONS.

Some difference of opinion exists as to the precise meaning of the term *poison*. In popular language it is considered to denote any substance which, when administered in a sufficient quantity, has the property of destroying life. This definition is too broad, as it would include not only almost every medicinal substance, but also a large proportion of the compounds prescribed by Dr. Kitchener in his well-known work.

Professor Liebig defines a poison to be a substance which either prevents the organic transformations necessary to sustain vitality, by virtue of a chemical affinity, more powerful than that of the organ on which it acts, or gives rise to a certain process of decay analogous to putrefaction or fermentation, and in this manner overcomes the vital functions. In accordance with this view, he classifies poisons into the inorganic and the organic; but the mineral acids, oxalic acid, the caustic alkalis, and all those substances which occasion the direct destruction of the tissues with which they come in contact, are not included in the list of poisons by Professor Liebig; because, he states, that their injurious effects depend merely upon their condition, and not upon either of the two modes of operation above mentioned.

For our present purpose we must consider every substance a poison which is generally treated of as such in works on Toxicology; and in taking this, which is the practical view of the subject, the evil of making the list too comprehensive would be less than that of restricting it too much.

Among the various plans which have been proposed for preventing the calamities which too frequently occur, it has been asserted that the sale of poisons to the public ought to be altogether

prohibited by law, and that these substances should be exclusively in the hands of medical practitioners.

This opinion is founded on too narrow a view of the case. Many tons of arsenic and sulphate of copper are annually employed for agricultural purposes. Many other highly deleterious substances are extensively used in the arts and manufactures; and although every precaution ought to be taken to avoid accidents in the use of these articles, the prohibition of their sale, even if practicable, would be attended with very serious commercial inconvenience.

It has been suggested, that in every shop where medicines are dispensed, a distinct place should be appropriated to poisons, which should be kept under lock and key, and never sold or dispensed except by a written order of a medical practitioner. This plan is adopted to a certain extent in Germany; but the laws relating to the medical profession in that country and in our own are so dissimilar, that the existence of the above regulation in the one case is no proof that it would be practicable in the other. In Germany, the practice of medicine, as well as the sale of drugs, is a monopoly under the immediate control of the government—a system which would not suit the prejudices and notions of freedom prevalent in Great Britain.

It has lately been proposed, that a list of poisons should be published annually; and that it should be illegal for any person, except a medical practitioner, to prescribe or administer any of the substances contained in that list. It would be no easy matter to reconcile the public to this regulation; since it would, if strictly acted upon, put a stop to the domestic use of some of the most valuable remedies, which, although undoubtedly poisons, are nevertheless frequently resorted to by persons unconnected with the medical profession, who would be indignant if they were told that they must not take a calomel pill, or a dose of James's powder, without consulting a doctor.

The objections which we make to the above-mentioned restrictions on the sale of poisons are, that they go too far, and at the same time fail to comprise some of the precautions which practical

experience has shown to be essential. It would, no doubt, be advantageous to the medical profession to enjoy a monopoly of the sale and administration of poisons; but in this case the medical profession must undertake to perform every manipulation in which poisons are concerned, and at a rate of remuneration which would place within the reach of all classes of the community those remedial agents which are comprised in the list.

When we consider the state of the law on this subject, the facility with which almost every kind of poison may be obtained, the absence of any law to regulate the education of those who deal in poisons, and the heedlessness which this legislative apathy is calculated to engender, it is not at all surprising that fatal results sometimes take place from the administration of poison, either wilfully or by misadventure, and it is evident that whatever regulations are practicable, and likely to diminish the evil, should be adopted. Cases of death from poison arise from three causes, which require consideration:—criminal poisoning, the accidental administration of substances not intended to be taken medicinally, and the exhibition of powerful medicines in poisonous doses.

When poison is desired for criminal purposes, the parties usually applied to are the Chemists and Druggists, and whatever be the state of the law on this point, it is the interest as well as the duty of every person, when such an application is made by a stranger, to question the party very closely as to the purpose for which the substance is to be used, and any other particulars which may be important. If the applicant decline to give name and address, and if the answers to other questions be at all confused or evasive, and denote little or no acquaintance with the nature of poisons, the article should be refused.

The substances usually employed for criminal poisoning are arsenic and laudanum. As a general rule, arsenic should never be sold unless by order of a medical man. It is frequently applied for as a poison for rats, but even in the absence of any criminal intention, it ought never to be admitted in a kitchen, and a Chemist should refuse, under any circumstances, to sell to a

stranger a substance which he would think it unsafe to use for the purpose on his own establishment. In agricultural districts, where it is extensively used for making a lotion for sheep, and for other purposes, an exception must be made, but in these cases, the quantity required is more than would be needful for any criminal use, the parties applying for it are generally known, or if not known, ought not to be trusted.

Laudanum being habitually used by many patients who by experience are well acquainted with its properties, more delicacy is required in the interrogations which may seem to be called for to guard against accident. When the party gives a clear account of the symptoms for which it is used, and the dose which is found to answer the purpose, the remedy may be given without risk; but any particular agitation or disposition to evade inquiry should induce caution, and would, in general, justify a Chemist in refusing to sell it. To strangers only a small quantity should be sold, under almost any circumstances, and the bottle should of course be distinctly labelled *poison*. These and similar precautions are naturally adopted by respectable Chemists for their own sakes, no less than from a regard to the safety of their customers. For the name of a Chemist to be associated in the public papers with any case of poisoning, is a very serious matter, even when no positive blame can be attached to him; and the caution arising from this dread of exposure is as effectual a check on the sale of poisons for criminal purposes as a legal prohibition. The absence of this prudential habit denotes ignorance or want of experience, and shows that the party is not qualified for the business of a Pharmaceutical Chemist, the remedy for which deficiency is improved education in all those who enter the business.

There are many deleterious substances in constant use for various domestic purposes, or for the arts and manufactures, which are very seldom used criminally, but which sometimes occasion death by accidental administration. We allude to oxalic acid, salt of sorrel, the salts of mercury, copper, and lead, cyanide of potassium, iodine, oil of vitriol, &c. &c. In selling any articles

of this class, the most important precaution is that of affixing a label in every instance, with the word *poison* in distinct characters. In the case of oxalic or any other acid, the label should be printed, as writing-ink is likely to become obliterated. It should also be ascertained that the purchaser is acquainted with the properties of the substances, and to this point the inquiries should be directed rather than to the motive, unless in any particular case in which there may be ground for suspicion.

The necessity of labelling every parcel or bottle which is sent out of a Druggist's shop cannot be too strongly urged. Even a dose of rhubarb or jalap, a soda powder, or an ounce of arrow-root, should have the name distinctly written. This habit should be so invariable, that it should be done intuitively, and without regard to pressure of business or the haste of customers, who sometimes say, "Don't take the trouble to write on it, I shall know what it is." A Chemist who is fully sensible of the liabilities to which he is exposed as a dispenser of medicines, would be likely to dream of a coroner's inquest, if, at night, he were to recollect having sent out any article during the day without a proper direction.

In the case of lotions and liniments, it is sometimes proper to affix a "poison" label, but the words "for external application" are frequently adopted, as being less likely to occasion alarm in the mind of the patient. It is also the custom in some houses to send out external remedies in blue bottles, for the sake of distinction. This is a good regulation if invariably adhered to, but it loses its efficacy if departed from occasionally, for want of a blue bottle of the proper size, or from inadvertence. The use of distinctly printed labels is the most effectual precaution: these labels should be pasted on the bottle, not tied round the neck. The label for a draught, which is to be taken at one dose, may be of either description; but mixtures containing several doses, all external applications, and especially those of a poisonous nature, should invariably be sent out with pasted labels.

It is common in every case to label laudanum *poison*, and the

public understand the motive for this custom: but there are other preparations frequently used as domestic remedies, which are not considered *poisons* according to popular belief, and which nevertheless require equal caution in their use. We allude to tincture of henbane, tartar emetic, calomel, colchicum wine, Dover's powder, &c. &c. In these cases, the word *poison* might occasion needless alarm, and it may be a sufficient warning to write the dose on the label, or at all events to make the patient fully acquainted with the necessary precautions. It has been said that such remedies ought not to be taken without medical advice; but it would be difficult to convince patients in general that this is the case, as they often tell us that "at the age of forty, a man must be either a fool or a physician." At all events, patients discover by experience what remedies suit them, and whether those remedies be potent or not, they persist in using them at their own discretion.

Besides the accidents which may arise from ignorance in those who take or administer medicines without professional advice, we must also consider the chances of danger from inadvertence. It is a custom with medical men to read carefully every prescription before they part with it to the patient, in order to satisfy themselves that it is correct. But it occasionally happens that the patient interrupts his medical attendant by conversation, and thus an omission or other oversight may occur in the prescription. It is the duty of the Chemist, when he observes such an oversight, to guard against any bad consequences by calling on the prescriber. This should be done, if possible, without the knowledge of the patient, who might be alarmed if he suspected an error, and this might shake his confidence in his medical attendant. In such a case it is enough to state that the medicine cannot be ready for some hours, allowing time to obtain the needful correction.

In this manner accidents are sometimes prevented, and the Chemist, in so doing, is merely fulfilling a duty for which every person who undertakes to dispense prescriptions ought to be

fully competent. This is one of the advantages resulting from every prescription passing through the hands of two persons, each being a salutary check upon the other.

The same kind of care is requisite in preparing prescriptions as in writing them, and the Chemist should invariably read over every prescription after he has prepared it, before he hands the medicine to the patient. A disregard of this practice implies a want of care and attention which is unpardonable in a dispenser of medicines.

In spite of all these precautions, human nature is not infallible. Misfortunes will now and then occur which cannot be accounted for; the dread of which cannot fail to occasion much anxiety in every person who is engaged either in prescribing or dispensing medicine, and whose reputation may be seriously injured, if not destroyed, by a single mistake.

Impressed with a sense of the responsibility which belongs to the office of dispensing medicines, a large proportion of which are, if improperly administered, deadly poisons, we have constantly insisted upon the absolute necessity of a regular education in all Pharmaceutical Chemists. It is surprising that this has not been demanded long ago by the whole medical profession for the sake of their own reputation, which is more or less dependent on the accurate administration of the remedies they prescribe. It is surprising that it has not been long ago claimed by the Chemists themselves, whose credit is injured by the influx of persons into their body, assuming the name without possessing any Pharmaceutical qualification. We hope the time is not far distant when this stigma will be removed, and the practice of Pharmacy will be placed exclusively in the hands of those who by their acquirements are entitled to the confidence of the public. With this view the Pharmaceutical Society was established, and nothing is now required but the sanction and support of an Act of Parliament to complete the success of the undertaking.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

TESTIMONIAL TO THE MEMORY OF THE LATE MR. CHARLES JAMES PAYNE.

The following Testimonial, engrossed on vellum, and framed for suspension in the Council-room, has lately been completed, and was laid before the Council at their last meeting, on the 1st of January :—

Pharmaceutical Society
OF
GREAT BRITAIN,
17, BLOOMSBURY SQUARE, LONDON.

At a Meeting of the Council, held on the 6th Nov. 1844,
It was Unanimously Resolved,
That THE COUNCIL wishes strongly to express its deep Sense of the loss the Society has sustained by the Decease of

MR. CHARLES JAMES PAYNE,

whose unremitting zeal, indefatigable and disinterested exertions, urbanity of manners, judgment, and moral worth, so eminently manifested in the discharge of the several Offices of

President, Vice-President, and Member of the Council,

conferred on the INSTITUTION a lasting and substantial benefit.

MR. PAYNE was ever the advocate of the cause of the CHEMISTS & DRUGGISTS and in an especial manner interested in the welfare of the less fortunate Members of the Body.

In the arduous labours attending the establishment of the
PHARMACEUTICAL SOCIETY,
in laying the foundation of the BENEVOLENT FUND, and in promoting the
EDUCATIONAL OBJECTS OF THE INSTITUTION,
the extent of his zeal could only be fully estimated by those who were associated with him.

To perpetuate the recollection of the Debt of Gratitude THE SOCIETY owes to so valuable a Member, THE COUNCIL has directed that this **Memorial**, engrossed on Vellum, be presented to his Daughter, and a Copy of the same be suspended in the Council Room.

ABSTRACT OF
A LECTURE ON TOXICOLOGY,

Delivered at 17, *Bloomsbury Square, November* 27*th*, 1844,

BY ALFRED S. TAYLOR, ESQ.,
Member of the Royal College of Surgeons, in London (1830), and Lecturer on Medical Jurisprudence and Chemistry, at Guy's Hospital.

The lecturer commenced by adverting to the frequency of accidents from poisoning: a circumstance which he attributed to the readiness with which deleterious substances are sold to the public, and which he observed rendered it imperative that those who deal in such substances should be acquainted with the means to be adopted on an emergency. A notion formerly prevailed that substances existed which, if taken before or after the administration of poison (of whatever nature it might be), would counteract its deleterious action. Among these "universal antidotes" the most famous was the ancient *mithridate*, which consisted of a great variety and number of ingredients, chiefly aromatics, in the preparation of which very minute instructions were given; and in the event of a failure, this was attributed to some error in the proportions or mode of preparation.

The belief in the existence of such universal antidotes has long since subsided—the means of relief now adopted being founded on scientific principles, and varying in each case, according to the nature of the poison.

The lecturer confined his observations to the counteraction of the effects of the poison by the administration of any substance which, by altering its properties, may obviate the result. The Chemist should be at all times prepared to proceed thus far in any case which might present itself, as he is the person to whom application is most likely to be first made on an emergency, and the success of the antidote would depend on its immediate application: the subsequent treatment devolving on the medical practitioner.

From statistical tables drawn up during the years 1837 and 1838, it appears that more than *one-third* of the cases of poisoning in this country were caused by arsenic, and about the same number by opium and its preparations.

The method of testing the efficacy of an antidote is easy, since it is obvious that unless it produces the desired effect in a test-glass, it cannot be expected to do so in the stomach. A departure from this principle implies empiricism, and must lead to uncertainty and disappointment. Charcoal and magnesia were formerly given as antidotes for arsenic, without any pretensions to a knowledge of their mode of operation. Experience has

shown that the faith in these remedies was misplaced; and the slightest chemical knowledge is sufficient to demonstrate their worthlessness.

Most poisons act either by being absorbed into the blood, or by destroying the parts which they touch: in both cases it is equally important that the action of the antidote should be rapid, otherwise the mischief would be done before the counteracting influence could ensue.

In considering the *modus operandi* of antidotes generally, they may be divided into two classes: first, those which render the poison less soluble, and therefore less liable to be absorbed into the body; and, second, those which neutralize them (as in the case of a mineral acid), giving rise to neutral and harmless chemical salts. Among the first class may be mentioned,

Corrosive sublimate, or bichloride of mercury: albumen is the antidote usually given. It produces a white insoluble precipitate, which though not altogether innocuous, is much less dangerous than the original poison. White of egg is generally given; but the yolk is equally efficacious, and need not be rejected.

Sugar of lead, or acetate of lead, is less violent in its action than bichloride of mercury; but it is a dangerous poison. The best antidote is the solution of sulphate of magnesia, or some other alkaline sulphate. The sulphate of lead, which is insoluble, is comparatively inert, or at all events much less dangerous than the soluble acetate.

For *sulphate of copper*, albumen is used as an antidote, it precipitates the oxide as an albuminate, which, however, is not so insoluble as that thrown down by bichloride of mercury. Excess of the antidote should be given.

The *soluble salts of barytes* are rendered less deleterious by alkaline sulphates, as sulphate of magnesia—the sulphate of barytes being very insoluble.

The best plan for effecting the decomposition is to administer the alkaline sulphate diluted with much water, at frequent intervals, and not in a concentrated state; as the strong solution may have a very injurious action on the body.

Oxalic acid is rendered insoluble by union with a salt of lime, such as chalk, whiting, or powdered mortar.

The use of the soluble salts of lime as antidotes for oxalic acid, is objectionable on two accounts:—In the first place, these salts are themselves irritants; and, secondly, when decomposed by oxalic acid, the acid previously in the salt, and which is set free in the stomach, may be injurious. This objection does not apply to the carbonate of lime, which should, therefore, always be preferred; it ought to be administered with water, mixed to the consistence of cream. The *compound powder of chalk*, of the Pharmacopœia, is a good antidote in these cases.

Hydrocyanic acid is so rapid and fatal in its action, that it is seldom practicable to apply an antidote successfully. A mixture of the protoxide and peroxide of iron has been used, which by uniting with the acid forms Prussian blue, which is a ferrocyanate of peroxide of iron, and is innocuous. Neither the green sulphate, nor any other salt of iron alone, will answer the purpose; but when used in conjunction with an alkaline carbonate, the common sulphate of iron (green copperas) has been found an efficacious antidote *.

Oil of bitter almonds also yields Prussian blue under the above treatment.

Cyanide of potassium may be decomposed, and rendered insoluble and innocuous by the sulphate of iron.

The other mode of counteracting the effects of poisons, consists in neutralizing them by substances which destroy their properties by forming harmless compounds not insoluble.

Oil of vitriol, or sulphuric acid, is most effectually neutralized by magnesia or its carbonate.

Nitric acid and *muriatic acid* admit of the same treatment.

The alkaline poisons, *caustic potash* or *soda*, or strong solutions of their carbonates, may be neutralized by vinegar or lemon juice.

In all the cases of poisoning above alluded to, the success depends on the promptness with which the antidote is applied, and in some cases, as in the administration of the mineral acids and caustic alkalies, the injury which is inflicted on the lining membranes of the œsophagus and stomach, cannot be repaired by any antidote, but must be relieved by subsequent medical treatment. In some cases, the poison is rapidly absorbed into the circulation, and when this has occurred, no antidote can be made available. Nevertheless, it is always proper to try any means which may be at hand, however slight may be the prospect of success.

In using an antidote which acts chemically, the chief point to be considered is the nature of the resulting compound, for if this be as deleterious as the original poison, no benefit can arise. For instance, carbonate of potash has been recommended as an antidote for oxalic acid; but it forms a soluble oxalate of potash, which is readily absorbed, and is no less injurious than the acid itself. Vinegar was formerly given in cases of poisoning by opium. This rather increases the evil, by forming a soluble and active acetate of morphia.

When substances are spoken of as insoluble, it must not be supposed that this is absolutely the case, nor must it be imagined

* See Messrs. Smith's paper, page 373.—Ed.

that a substance which is not appreciably soluble in water in a test tube is of necessity incapable of absorption into the system when taken into the stomach. For instance, the sulphate and carbonate of lead are equally insoluble in water, but the latter is an active poison, while the former is almost inert. The carbonate of copper is almost as violent a poison as the sulphate, although less soluble. Sulphuret of potassium was formerly given as an antidote for arsenic, but it is itself a dangerous poison, and although the sulphuret of arsenic is insoluble, the compound resulting from the use of this alleged antidote is highly deleterious.

Among other insoluble poisons may be mentioned the *arsenite of copper*, or Scheele's green, which is sometimes used for colouring articles of confectionary. In such cases we must resort to emetics or the stomach-pump as the only remedy.

There are some substances for which we have no antidotes, such as opium, iodide of potassium, strychnia, cantharides, and all the narcotico-irritant poisons.

For *iodide of potassium*, farinaceous substances have been recommended as antidotes; but there is no ground for believing that they are of any service.

The lecturer observed, that he could not discuss at length the modes of ascertaining what poison has been swallowed when suspicion exists; but briefly alluded to the division of poisons into three classes, according to the symptoms produced; namely, *irritants*, *narcotics*, and *narcotico-irritants*.

Irritants always occasion violent vomiting and purging, with severe pain in the abdomen. If it be suspected that these symptoms arise from poison, the means to be employed are, the removal of the contents of the stomach, and the administration of antidotes. The former measure is of the highest importance; for so long as any portion of the poison in any state remains in the stomach, the patient is not safe.

In general the irritant poisons act so effectually as emetics, that it is only necessary to promote vomiting by means of warm water. With oxalic acid much water is injurious, by dissolving the poison, and promoting its absorption. In this case, an emetic of sulphate of zinc or copper should be given. Fifteen or twenty grains every fifteen minutes until it acts. Ipecacuanha and tartar emetic should be avoided, as they are liable to occasion excessive nausea, which promotes absorption. Common mustard is a good emetic; a teaspoonful or two being mixed in a glass of water. Yellow soap, dissolved in warm water, also acts as an emetic; and the throat may be tickled with a feather.

Another method of cleansing the stomach is with the stomach-pump; which, however, should not be used in the case of caustic

alkalies, mineral acids, or any poisons which corrode the tissues. In other instances, when properly applied, it is often more effectual than emetics ; and the antidote can be introduced, and the contents of the stomach removed by one operation. The use of this instrument requires a knowledge of the anatomy of the throat as well as a little manual dexterity.

The *narcotic poisons* produce headache, giddiness, stupor, loss of consciousness, and inability to stand or move. They seldom give rise to vomiting, purging, or pain in the abdomen.

Opium is the most important of these poisons. The stomach-pump should be immediately used, if at hand; if not, one of the emetics recommended above, which, however, never act readily after opium, unless the patient be kept roused. The disposition to sleep must be resisted and overcome by walking about, dashing cold water on the chest, back, and head, rubbing the hands, chest, &c., with stimulating liniments, flagellation, mustard poultices, &c. No antidote for opium is known : vinegar was formerly given, but with no good reason ; ammonia has been recommended, but it can only derive efficacy from its stimulating properties. Strong coffee may also be useful as a stimulant. To ascertain whether all the opium is ejected, the contents of the stomach may be tested with a solution of sesquichloride of iron, which gives a dark red colour with meconic acid. This colour is not discharged by solution of bichloride of mercury.

The *narcotico-irritant poisons* produce symptoms of a mixed character, such as headache, giddiness, loss of consciousness, vomiting, and purging. They are chiefly of vegetable origin. The treatment should be the same as that employed for opium ; the most urgent point being the removal of the poison from the stomach.

The period at which the symptoms arise after any substance has been taken, may assist in forming an idea as to its poisonous quality. Irritant and corrosive poisons mostly produce the effect immediately or within a few minutes, and almost all poisons begin to act within an hour after they have been swallowed.

Arsenic (or arsenious acid) is the only poison which remains to be noticed. If vomiting exist, it should be assisted by mucilaginous drinks, or a mixture of linseed oil and lime water, which will facilitate the expulsion of the poison. Emetics should be given if needful, and the stomach-pump if at hand should be used without delay.

The hydrated peroxide of iron has been recommended as an antidote for arsenic, given with some alkali in a quantity at least twelve times that of the poison; opinions differ as to its efficacy, and the experiments on which its antidotal properties are founded, are not conclusive. Its action consists in forming an insoluble

arsenite of iron, but this can only take place when the arsenic is in perfect solution. Besides the uncertainty of effecting this result, it has been stated by some authorities, that arsenite of iron is a virulent poison. On chemical principles therefore, it cannot be depended upon, and reliance should chiefly if not entirely be placed on the speedy removal of the poison from the stomach.

An attention to this general rule, and the use of the antidotes above mentioned, whenever they are applicable, will, in all cases of poisoning, ensure to those who act with judgment and presence of mind, the satisfaction of reflecting that they have used all the means in their power, although they may not have succeeded in averting a fatal result.

PHARMACEUTICAL MEETING,

JANUARY 8th, 1845.

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

ON ELECTRO-METALLURGY.

BY MR. THOMAS MACKINLAY.

In the few remarks I am about to offer on the subject of electro-metallurgy, it is not my intention to enter into the philosophy of the process or the principles on which the art is based; but having, since the first introduction of the science, been actively employed for the purpose of amusement in working out the various processes, I comply with the request of my friend Mr. Bell, by giving to the Pharmaceutical Society a brief description of the most convenient forms of apparatus, of the various processes employed in manipulation, and the best solutions of the different metallic salts, together with some recent improvements in the art, which latter may prove interesting to the Members, though not new to those who have given their attention to the subject.

ON THE FORMS AND ARRANGEMENT OF APPARATUS

In the deposition of metals where voltaic electricity is the power employed, there are two descriptions of arrangement: the first where the surface on which the deposit is formed is itself a part of the apparatus whence the power is generated; the other in which the object receiving the deposit forms no part of the apparatus, but where the power is procured from a battery; the former is termed the single cell, the latter the battery process. The forms of voltaic batteries used are numerous, and in most

cases known by the names of their respective inventors; specimens of Daniell's, Smee's, and Grove's batteries are now on the table. The constant battery of Professor Daniell will be found most generally useful, it is termed *constant* from its possessing the power of continuing in action for a lengthened period; it may be made in various forms, and consists of a copper cell, divided into two parts by a porous diaphragm or partition, which may be formed of wood, paper, plaster of Paris, earthenware, or animal membrane. The outer cell is filled with a saturated solution of sulphate of copper, a perforated shelf supplied with crystals of this salt is placed at the upper portion, as that part of the solution is soonest weakened, the specific gravity retaining the stronger portion below. The inner cell is filled with water, to which a few drops of sulphuric acid are added, and in which a rod or plate of amalgamated zinc is placed, to which, and to the copper of the outer cell, wires are attached. This battery may be generally employed for the purposes of plating, gilding, and platinizing, and is one of the most economical modes of reducing copper. The simplest form of apparatus used for the deposition of metal, more particularly copper, is the single cell (specimens of which are now before you); it resembles in the number of its parts a Daniell's battery; the surface to be deposited on representing the copper of the outer cell. The diaphragm may be formed of plaster of Paris, brown paper, or thin wood; but the action is always most rapid when the diaphragm is thinnest; if a mould of metal or other substance be attached to the zinc in the cell containing the acid and water, and introduced into the sulphate solution, if the metallic communication between the mould, and the zinc be complete, after a short immersion the former will become coated with a deposition of metallic copper, which goes on increasing in thickness as long as the strength of the cupreous solution is kept up—the majority of moulds and articles now shown were deposited by this process. Within a few months past, magneto-electric machines have been employed for the deposition of metals; and in Birmingham, plating is carried on to a considerable extent by machines, formed by peculiar arrangements of compound magnets, one of which, lately manufactured by Mr. Woolrich, is capable of depositing from 300 to 500 ounces of silver per week; but as such machines are difficult in management, and expensive in construction, they are not well suited for the purposes of experiment.

ON THE PRODUCTION OF MOULDS, &c.

Moulds may be formed either of metallic or non-metallic substances; in the latter case it is absolutely necessary that the surface of the mould submitted for deposition should be a conductor of

electricity, and the best conductors are metals and carbon. Moulds for small objects as coins or medals, may readily be made of lead or fusible metal: a very simple plan is to place the object between two strips of the former metal, scraped perfectly clean, subjecting the whole to the action of a press. Moulds may be formed of wax, stearine, tallow, plaster of Paris, sealing wax, &c. &c.: the surfaces of either of these materials may be covered with good plumbago, after fixing a metal wire into the mould to be deposited on; the powder should be rubbed lightly over with a soft brush, taking care that it adheres to all parts. The deposition takes place at the wire by which the article is connected with the battery or cell, and spreads gradually from that point till the whole surface is covered; but this process is limited to the deposition of copper only, as gold and silver will not spread to any extent on a black-leaded surface. Wood may be prepared to receive a deposit in the following manner:—The surface of the block or piece intended to be deposited on, is dipped in a weak solution of nitrate of silver, contained in a flat vessel, remaining for a few minutes in order that by capillary attraction the nitrate of silver may be drawn into the wood; a small portion of a solution of phosphorus in spirits of turpentine being poured into a watch-glass, and placed on a sand-bath, is allowed gradually to evaporate; on holding the surface of the wood over the vapour an immediate change occurs, the nitrate of silver is converted into metallic silver, and the object may at once be placed in the battery to receive a deposit of copper. In this manner the interior of a plaster mould may be rendered a conductor; but as this plan can only be adopted with substances which can be wetted with the solution of nitrate of silver, an improvement has lately been introduced, by the adoption of a solution of phosphorus instead of the vapour of that substance. The best known solution is bisulphuret of carbon, which easily dissolves a considerable portion of phosphorus.

If the article to be coated is dipped for a moment in a solution of one part of phosphorus, to twelve parts of bisulphuret of carbon, on withdrawing it the bisulphuret of carbon, which is very volatile, will evaporate, leaving a film of phosphorus on the surface; the article is then immersed in a dilute solution of nitrate of silver, or sulphate of copper; a precipitate of silver or copper is immediately formed, and thus becoming an electric conductor it may be introduced into the galvanic cell, and the process will proceed in the same manner as it does when plumbago is used in the first instance. By this simple and elegant method the most delicate articles, as feathers, flowers, fruit, insects, &c., may be coated with metal. The surface should in all cases be free from moisture before it is introduced into the solution of phosphorus,

which should be used with the greatest care, being highly inflammable. Phosphorus added to wax and stearine form an excellent coating for casts, as the surface becomes a conductor. Moulds of plaster of Paris being very porous, require to be saturated with wax, oil, varnish, or tallow, before receiving a coating of plumbago, otherwise when placed in the solution they will absorb the liquid, and the air which previously filled up the pores will be driven out, covering the surface of the mould with small bubbles. Flexible moulds for copying objects which are undercut, or overhung, may be made of a mixture of glue and treacle—this mixture is easily removed from the projecting parts, immediately regaining its proper form.

The colour of bronze is given to copper articles deposited by voltaic action by different methods. A very simple plan is to rub the article with plumbago immediately, or as soon as practicable, after its removal from the battery; afterwards heating it, and rubbing it with a hard brush. A lighter tint may be obtained by covering the surface with oxide of iron, and giving it a considerable heat. Hydrosulphate of ammonia produces a fine colour, and a dilute solution of chloride of platinum gives the object an agreeable tint.

ON ELECTRO-GILDING, PLATING, PLATINIZING, &C.

The metals reduceable by voltaic agency for purposes of utility, are gold, silver, platinum, copper and zinc; these may be precipitated from their salts, or from the solutions of their salts in any material capable of dissolving them, and any desired deposit may be made by adjusting the strength and temperature of the solution to the intensity and power of the current of electricity employed. Gold may be deposited from its chloride, bromide, cyanide, iodide, sulphite, and hyposulphite; but for all purposes of gilding, I much prefer a solution of the cyanide, which may be prepared by adding oxide of gold to the solution of cyanide of potassium. The most eligible proportions may be stated as follows: Two pounds of cyanide of potassium dissolved in one gallon of water, to which are added one ounce and a half of oxide of gold; but if heat is employed, and the solution is raised to the boiling point, the quantity of water may be doubled. A single pint battery of Daniell's, possesses sufficient intensity to gild any specimen now before you—the articles to be gilt must of course be attached to the zinc of the battery, and a plate of gold, of corresponding or greater dimensions, to the copper. The surfaces of all objects to be gilt, plated, or deposited on, must be thoroughly cleansed before being introduced into the solution; oxide, grease, or other impurities, may be removed by immersion

in dilute sulphuric acid. The gold thus deposited may be coloured to produce the red tint so generally admired, by being coated with a mixture of acetate of copper, sulphate of alumina, and bees'-wax, and exposed to heat till the whole is consumed ; and a rich orange colour may be obtained by gently boiling the following ingredients together in water till they have a creamy consistency :—Five parts of nitrate of potassa, two parts of sulphate of alumina, one part of sulphate of zinc, and one part of sulphate of iron. The gilt object should then be dipped three or four times in the composition, and allowed to become nearly dry, and afterwards removed to a stove, when, according to the length of exposure to heat the depth of colour will be increased : it should finally be well washed, and cleaned with soap and water and a brush.

Silver can be precipitated from its cyanide, acetate, sulphate, sulphite, or hypo-sulphite. A solution of one pound and a half of cyanide of potassium in one gallon of water, to which two ounces of oxide of silver are added, answers admirably for all purposes of plating. For some time after the introduction of electro-gilding and plating, complaints were made of defective adhesion between the original and the deposited metal, and I was assured by the manufacturers of similar articles on the old principle, that such plating and gilding would soon wear away, and exhibit the baser metal in all its original nakedness. There was, it must be admitted, some justice in this remark, though articles I plated three years ago have been in daily use without showing any traces of the copper beneath. This defect was occasioned by the absence of an alloy, but the objection has lately been altogether removed by the use of mercury, for the purpose of alloying the two metallic surfaces; for this purpose, nitrate of mercury is dissolved in water, and the copper article to be gilt or plated is plunged in the solution, and immediately withdrawn, then washed in water, and placed in the gold or silver solution. A thin film of mercury is by this means distributed over the object, and amalgamating with both metals, completely alloys them. The articles after being gilt or silvered, should be heated to 600° Fahr., which dissipates the mercury. Another complaint against electro-plating was, that the articles rapidly tarnished on account of the purity of the metal deposited. This may be obviated by brushing them over after removal from the vat with a saturated solution of biborate of soda, allowing them to dry so that a film of the salt may remain, repeating the process a second or third time, till a slight but regular coating of borax covers every part; they should then be exposed to a red heat, and after being allowed to cool, immersed in dilute sulphuric acid, and dried in heated saw-dust. The metals to which plating are most appli-

cable, are copper, brass, pewter, iron, steel, and gold; the process is also extensively employed for silvering articles formed of the alloy of nickel, known as German silver.

Platinum may be reduced from solutions of its bromide, iodide, and bi-chloride, and the double chloride of platinum and sodium: the chloride is the salt commonly employed, but as considerable difficulty exists in depositing this metal in a ductile state, a very feeble current of electricity should be employed, and the plate of metal introduced as an electrode should be very small; it is of great advantage to have the solution neutral, and I would therefore recommend soda being added to it, thus forming the chloride of sodium and platinum.

Zinc may be deposited from its iodide, acetate, sulphate, and chloride, also from the solution of oxide of zinc in potassa, or muriate of ammonia.

Copper may be thrown down from a considerable range of its salts, those commonly used are the sulphate, nitrate, and cyanide.

Mr. Redwood observed, that one of the processes alluded to in Mr. Mackinlay's paper would be of considerable practical value to Dispensing Chemists if it could be economically and efficiently applied. He alluded to the deposition of platinum in the ductile state on the pans of dispensing scales. It was well known that the copper or brass scale-pans usually used in dispensing, were very liable to become corroded from the action of many of the substances weighed in them, and this inconvenience would be obviated if they could be covered with a thin coating of platinum by the electric process. He (Mr. R.) had found a difficulty in doing this well, as the platinum was frequently thrown down in places in the state of a black powder. He had been informed by persons practically experienced in electro-metallurgic processes, that this difficulty might easily be overcome, and he begged therefore to suggest that Mr. Mackinlay would be conferring a great boon upon the Society if he would communicate the details of the process by which the platinizing of copper or brass surfaces may be successfully effected. There was another process alluded to by Mr. Mackinlay, namely, that of plating copper vessels through the influence of electricity, which had been applied to Pharmaceutical purposes, but with regard to the value of which, in this application of it, some difference of opinion had been expressed. It was stated some time ago, by Mr. Warington, of Apothecaries' Hall, that the silver thus deposited on copper vessels was in so porous a state, as to admit of the action of acids put into such vessels, upon the copper underneath.

Mr. Mackinlay said, he had no doubt that in both the cases mentioned by Mr. Redwood, the imperfections alluded to could easily be overcome. In the platinizing process, it was important to use a strong solution of platinum and a weak current of electricity; while in the silvering process the solution should be weak and the current rather strong.

AN ACCOUNT OF A CUCURBITACEOUS FRUIT,

EMPLOYED AS A VIOLENT PURGATIVE BY THE NATIVES OF BRAZIL, AND RECENTLY BROUGHT TO ENGLAND;
TOGETHER WITH A SHORT NOTICE OF ITS ACTION AS A THERAPEUTIC AGENT

BY S. SCOTT ALISON, M.D.
Member of the Royal College of Physicians, London; Physician to the Northern Dispensary, St. Pancras, &c. &c.

A FEW weeks ago, a friend, recently arrived from the Brazils, put into my hands three dried fruits, which he informed me were called *Cabacinha*, and were in common use as a violent purge among the natives of Pernambuco. The fruit, I was informed, is abundant in Pernambuco, and is obtained at a moderate price in the shops of the Chemists of that province. I was further informed that the cabacinha is administered chiefly in the form of injection:—"One of the fruits is cut into four pieces, one part is selected, and macerated in seven successive waters; it is then infused in a cupful of hot water: the infusion is now exhibited as an injection. The cabacinha is seldom taken by the mouth, and only in very desperate cases."

The cabacinha has been submitted to an eminent botanist, who has been kind enough to furnish the following account of it:—"This cucurbitaceous fruit is one of the luffas, a tribe closely allied to the colocynth and momordicas; and is no doubt a powerful purgative."

A specimen of the fruit lies upon the table. It will be found to be about the size of a small pear. It resembles the wild cucumber, and consists of an epicarpium, very thin, and of a light olive colour; and a sarcocarpium of a white reticulated structure, resembling that of the prickly pear. In the interior are three loculamenta, which contain a few flat seeds, resembling those of the cucumber. The seeds are white; but one is of a dark olive colour, and somewhat thicker than the rest. The outer covering presents numerous spines running in longitudinal lines from the base to the apex of the fruit.

One of the fruits was put into the hands of Mr. Morson, of Southampton Row, who kindly prepared a tincture from it. From the residue he also prepared an aqueous extract. The fruit

weighed seventeen grains; the tincture obtained amounted to scarcely three drachms, and the aqueous extract to one grain.

The tincture, which is before the society, is of a very faint green colour. It is exceedingly bitter, and is destitute of odour. The extract is of a dark brown colour, resembling powdered catechu. It is intensely bitter.

Therapeutical action of luffa.—On account of the very small quantity of the fruit available for the purpose, I have been unable to test its action very fully on the human body; yet so much has been effected as to afford some information on the subject, which will assist in forming a correct idea of the properties of this fruit, and of its value as a therapeutic agent.

One-eighth of a grain of the extract was given to a boy, five years old, affected with dropsy subsequent to scarlet fever. The bowels had not been moved for some time without medicine. In twelve hours the patient passed a copious loose stool. The same dose was repeated, and again the same result followed.

The eighth part of a grain was given to a young lady, of rather constipated bowels. Within an hour she was affected with nausea and slight griping, which continued for a day. No stool followed till the third day, when the bowels were freely relieved. For several days after, the bowels were less than usually constipated, and the patient said she had not felt so comfortable for some time before.

A gentleman, thirty years of age, rather delicate, and suffering from slight nervous head-ache, took one quarter of a grain of the extract. Within a quarter of an hour he became overcome with faintness and nausea. He swallowed a little warm water, and he immediately vomited freely. No violent action of the bowels followed, but for some days after, the stools were more than usually copious.

Thirty drops of the tincture were administered to a boy seven years old, convalescent from scarlet fever. He soon after fell asleep, and did not awake for four hours, which was very unusual with him. For seven hours no stool was passed; and at the expiration of that time, the same dose was again exhibited.

In a quarter of an hour he vomited freely. This was repeated three times. He slept well during the night, and in the morning he passed four copious loose light brown stools.

A lady whose bowels are constipated to an extraordinary extent, and who is in the habit of taking a quarter of a pound of Epsom salts at a time, took forty drops of the tincture. She was affected with nausea for two days, she retched a little, but no catharsis was produced. I could not afford to repeat the dose.

A boy, aged seven years, affected with the thread worm, was

put under the operation of the tincture. Thirty drops were added to an ounce and a half of warm water, and thrown into the bowel. The injection was retained thirty minutes. It was then discharged, accompanied with much mucus, in which were observed about half a hundred thread worms, all of which were perfectly motionless. In this case, calomel and rhubarb had been previously administered, with the effect of discharging several thread worms, but they were invariably alive.

From the foregoing account of the action of the tincture and extract of luffa, it appears that it is capable of acting as an emetic, a drastic purgative, and as an anthelmentic. In one case, sleep of four hours' duration followed the administration of the tincture at an unusual period of the day, hence there is some reason to think that luffa may, like the Indian pink, possess a narcotic property.

Luffa resembles in its action both elaterium and colocynth, all which belong to the same natural family, *viz.*, the cucurbitaceæ.

From a careful observation of the action of luffa, certainly to a very limited extent, it appears to me that it is possessed of properties which entitle it to the notice both of the Physician and the Chemist. There is reason to believe that a further acquaintance with its action will indicate it as a valuable remedial agent in several diseases. In obstinate constipation, in dropsy connected with visceral obstruction, and in cases of worms, there is room to think it probable that luffa may prove very serviceable.

Of the two preparations of the fruit, the tincture appears to be the more efficacious as a purgative and anthelmentic. But on this head there is room for further observation.

The mode of administration will admit of variation according to circumstances; where the action of the whole intestine is required, exhibition by the mouth will be indispensable. If vomiting be desirable, warm water may be drank after its administration. Where vomiting is to be guarded against, a few drops of tincture of hyosciamus, or opium, might be added. The extract may be combined with soap or extract of hyosciamus, and exhibited in the form of pills. In the case of thread worms, which are for the most part confined to the lower gut, the luffa might be advantageously used as an enema.

Lastly, I would mention that this medicine may, perhaps, be applicable in cases of tape worm. I have a case in view in which it is my intention to exhibit the luffa; and should the result be at all worthy of notice I shall not fail to make the fact known.

48, *Gower Street, 7th January,* 1845.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE EXAMINATION OF THE PRECIPITATE IN *LINIMENTUM ÆRUGINIS.*

If this preparation be examined in the bottle, in which it has remained at rest for a short time after it has been shaken, a copper-coloured deposit will be seen at the bottom of the vessel, and for some height above will also be discovered a turbid appearance composed of brown particles, which very slowly subside from the treacle-like liquid which characterises the compound.

The glittering character of the copper-coloured precipitate first attracted my attention, and I was induced to examine it microscopically under the expectation of finding a beautifully crystalline object; in this, however, I was disappointed, the small particles having merely a minutely granular character, which was unattractive when magnified, and then appeared to be very finely divided copper, which had been reduced from the subacetate by the saccharine principles of the honey employed in the preparation.

The most curious part of the examination consisted in finding that the lighter turbid portion was composed of the *pollen* of many varieties of plants, which no doubt became mixed with the honey by adhering to the limbs and bodies of the bees whilst they visited the various flowers for procuring it.

On examining honey from various localities, the pollen of various plants is always to be seen, forming a portion of it, and, in some instances, exists in a considerable quantity.

Edwin J. Quekett.

50, *Wellclose Square, Jan.* 17*th*, 1845.

CURRIE POWDER.

In compliance with the request of several Correspondents, we subjoin a few formulæ for Currie Powder, which, for the sake of convenience, are given in the form of a table. The formulæ, L. M. N. were from a correspondent (Juvenis); O. from W.W. K., the remainder we have obtained from various sources, and leave our readers to find out by synthetical analysis which is the best. The character of a currie is in some measure dependent on the cookery, and for instructions on this point we refer our readers to Eliza Acton's work, which is noticed, page 385. As a general rule we may observe, that the colour of currie powder ought to be of a light yellowish brown, not bright yellow; and some of the formulæ which we have given, contain more turmeric than would be approved by connoisseurs.

	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.	O.	P.	Q.	R.	S.	T.	U.
Turmeric	4 oz.	2 oz.	3 oz.	5 oz.	6 oz.	2 oz.	8 oz.	6 oz.	8 oz.	3 oz.	2 oz.	8 oz	6 oz.	4 lb.	3 oz.	8 oz.	2½oz	8 oz.	3 oz.	4 oz.	2 oz.
Coriander Seeds	8 oz.	6 oz.	1 oz.	3 oz.	1 oz.	1 oz.	2 oz.	13oz	2 oz.	4 oz.	2 oz.	16oz	6 oz.	4 lb.	6½oz	4 oz.	1¾oz.	2 oz.	12oz	13oz	6 oz.
Ginger	3 oz	½ oz.	1 oz.	1 oz.	1 oz.	2 oz.	2 oz.	—	—	2 oz	2 oz.	—	—	1 lb.	1 oz.	—	½ oz.	2 oz.	—	2 dr.	
Cinnamon	½ oz.	2 dr	—	—	¼ oz.	—	—	—	½ oz.	—	—	—	—	—	1½oz						
Cassia	—	—	—	—	—	—	—	—	2 oz.	—	—	—	—	2 oz.	—	—	—	—	2 dr.	2 dr.	
Cardamoms	½ oz.	—	1 oz.	1 oz	—	½ oz.	1 oz.	—	—	2 oz.	½ oz.	—	—	4 oz.	—	—	½ oz.	—	½ oz.	2 dr.	
Grains of Paradise	—	—	—	—	—	—	—	—	1 oz.	—	—	—	2 oz.								
Chillies	2 oz.																				
Caraways	—	—	—	—	—	—	—	—	—	—	—	—	4 oz.								
Cayenne	—	6 dr.	¾ oz.	1 oz	½ oz	½ oz.	1 oz.	1 oz.	½ oz.	2 oz.	½ oz.	1½oz	½ oz	1 lb.	½ oz.	½ oz.	½ oz.	1 oz.	6 dr.	½ oz.	½ oz.
Black Pepper	1½ oz	½ oz	—	1 oz.	4 oz.	—	2 oz.	2 oz.	1 oz.	1 oz	—	1½oz	1 oz.	—	2½oz	—	½ oz.	—	2 oz.	2 oz.	3 oz.
Mace	—	1 dr.	—	¼ oz	—	—	—	—	2 dr.	—	—	—	—	1 oz.	—	—	½ oz.				
Fœnugreek	—	1½oz.	½ oz.	—	1 oz	—	—	—	—	—	—	2 oz.	—	—	1 oz.	2 oz.	—	1 oz.	1 oz.	—	1 oz.
Cummin	2 oz.	—	½ oz.	—	1 oz.	½ oz.	2 oz.	3 oz.	—	—	½ oz.	—	—	—	—	2 oz.	—	1 oz.	4 oz.	3 oz.	2 oz.
Pimento	—	2 dr.	—	—	—	—	—	—	—	—	—	—	—	1 lb.	1 oz.	—	—	—	2 dr.	2 dr.	
Cloves	—	1 dr.	—	—	—	—	—	—	½ oz.	—	—	—	—	1 oz.	2 dr.	—	—	½ oz.	2 dr.	2 dr.	
Nutmeg	—	½ oz.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 oz.			
White Pepper	—	—	1 oz.	—	—	1 oz.	—	—	—	—	1 oz.	—	—	—	—	—	—	1 oz.			
Scorched Mustard	—	—	—	2 oz.	—	—	—	—	—	3 oz.	—	—	—	—	—	—	1 oz.				
Lemon Peel, in powder	—	—	—	—	—	1 oz.	—	—	—	—	1 oz.										

VETERINARY MEDICINES.

In a former number of this journal, we promised to give an occasional notice of the medicines employed in veterinary practice, together with some formulæ for their preparation. The Pharmaceutical Chemist and Druggist is constantly called upon to supply medicines of this description, without any precise directions being given as to their composition. We have thought, therefore, that a few selected formulæ, derived from the best sources at our command, may be acceptable to many of our readers. The subject, however, is a comprehensive one, and some classification will be necessary. The following is that which we propose adopting:—

1st. *Medicines intended for internal application.*—Alteratives; anthelmintics; antispasmodics, narcotics and sedatives; cathartics; cordials, stimulants, and expectorants; demulcents and restoratives; diuretics and diaphoretics; tonics and astringents.

2d. *Medicines intended for external application.*—Astringents and antiseptics; caustics and detergents; digestives and discutients; emollients; poisons for vermin; refrigerants; traumatics; vesicants and rubefacients.

Alteratives (from *altero*, I change) are medicines intended to re-establish the healthy functions of the animal economy, without producing any very sensible evacuation. Antimony frequently enters into the composition of the veterinary medicines of this description.

ALTERATIVE BALLS.

No. 1.

℞ Spiked Aloes ℥iv—Soft Soap ℥iv—Linseed Meal and Treacle, each ℔j. Mix into a mass, to be divided into balls weighing ℥j each. [Morton.]

No. 2.

℞ Spiked Aloes ℥viij—Soft Soap ℥viij—Linseed Meal and Treacle, each ℥viij. Mix into a mass, to be divided into balls weighing ℥j each. [Morton].

No. 3.

℞ Barbadoes Aloes ℥jss—Potassio-tartrate of Antimony ℥j—Soap ℥ij—Linseed Meal and Treacle, each sufficient to form a ball.

No. 4.

℞ Sulphur ℔j—Nitrate of Potash, Sesquisulphuret of Antimony, Fœnugreek Seeds powdered, each ℔ss—Venice Turpentine ℥xij—Treacle sufficient to form a mass. To be divided into balls of ℥iss each.

No. 5.

℞ Sesquisulphuret of Antimony, Nitrate of Potash, Sulphur, Ethiop's Mineral, each ℥iij—Soap ℥x—Oil of Juniper, ℥iij. Mix, to form twelve balls. [J. Bell and Co.]

No. 6.

℞ Sulphur, Nitrate of Potash, Sesquisulphuret of Antimony, each ℔j—Resin ℔ss—Treacle and Linseed Meal sufficient to form a mass, to be divided into balls of ℥jss each.

ALTERATIVE POWDERS.

No. 1.

℞ Sulphur 2 parts—Sesquisulphuret of Antimony, Nitrate of Potash, each 1 part. Mix into a powder, of which from ℥ss to ℥j is to be given for a dose. [Morton.]

No. 2.

℞ Sesquisulphuret of Antimony, Bitartrate of Potash, Nitrate of Potash, each ʒij. Mix into a powder. [Blaine.]

No. 3.

℞ Sulphur ℥ss—Bitartrate of Potash, Nitrate of Potash, each ʒij. Mix into a powder. [Blaine.]

No. 4.

℞ Sesquisulphuret of Antimony ℥iv—Sulphur ℥ij—Bean flour, or Barley Meal lbss. Mix into a powder. A tablespoonful for a dose. [Bracy Clark.]

Anthelmintics, (from *ἀντὶ*, *against*, and *ἕλμινς*, *a worm*) are medicines for destroying and causing the evacuation of worms from the stomach and intestines.

WORM BALLS.

No. 1.

℞ Barbadoes Aloes ʒiv—Calomel ʒj—Ginger and Soap, each ʒij—Oil of Cloves 10 drops—Treacle sufficient to form a ball.

No. 2.

℞ Barbadoes Aloes ʒiv—Powdered Tin ʒiij—Ginger ʒj—Soap ʒij—Treacle sufficient to form a ball.

No. 3.

℞ Barbadoes Aloes ʒv to ℥j—Powdered Tin ʒij—Ethiop's Mineral ʒij—Powdered Ginger ʒj—Oil of Aniseed gtt xx—Oil of Savine gtt. xx—Treacle sufficient to form a ball. [J. Bell and Co.]

WORM DRENCH.

No. 1.

℞ Common Salt ℥iv—Powdered Aloes ʒij—Water Oij. Mix.

No. 2.

℞ Oil of Turpentine f. ℥iv—Oatmeal gruel Oj. Mix.

No. 3.

℞ Oil of Turpentine f. ℥iv—Castor Oil or Linseed Oil f. ℥viij—Oatmeal Gruel ℥viij. Mix.

ON THE BLACK OR MAGNETIC OXIDE OF IRON,

WITH A NEW PROCESS FOR ITS FORMATION, AND REMARKS ON ITS COMPOSITION.

BY RICHARD PHILLIPS, JUN.

In the June number of the *Pharmaceutical Journal* I proposed the following process for the formation of the red or sesquioxide of iron :—" Take of protosulphate of iron, crystallized, 12 atoms, or 1668 parts; of carbonate of soda, crystallized, 12 atoms, or 1728 parts; of chlorate of potash, one atom, or 124 parts. Dissolve the sulphate of iron and carbonate of soda

separately in hot distilled water, mix the solutions whilst warm, and when boiling add the chlorate of potash, also previously dissolved. The chlorate of potash being decomposed, yields up its oxygen to the protoxide of iron first precipitated, and converts it into sesquioxide." And I may add that, previously to publishing the process, I repeated it several times, and uniformly with success. My friend, Mr. Redwood, however, wishing to make some of the hydrated sesquioxide by this method, found, that instead of forming this compound, the protoxide was converted by the chlorate of potash into the black, or magnetic oxide; and that no excess of chlorate of potash which he might add would change the nature of the product.

Considering this difference of result between our experiments to be extremely curious, and to require further investigation, I made the experiments I shall now detail to ascertain its cause. I again repeated the process in the same manner and on the same scale, and formed as before the red oxide; but wishing to make a smaller experiment, I found, as Mr. Redwood did, that I formed the black oxide, which no addition of chlorate of potash would decompose; and I ascertained the difference to depend on this fact, that it was necessary that the whole of the chlorate of potash should at one time be added to the protoxide of iron; but that, supposing instead of adding the one atom, or 124 parts of chlorate of potash to the quantities I have mentioned as having operated upon, I added 123 parts of this substance, the protoxide was changed into the black, which oxide being a permanent one, was not acted upon by excess of the oxidizing agent. And that the reason of the difference of my results simply depended on my having, in my first experiment, employed a common balance, and added a slight excess of the chlorate sufficient to compensate for its impurities, whilst in the second or smaller experiment, a more delicate one being used the excess was avoided.

With regard to the colour of the red oxide, I have obtained it from the shade of a yellowish-red to a deep red, and this difference is caused by the temperature of the solution containing the protoxide when the chlorate of potash is added: at a temperature of about 160° the yellowish-red being formed, and at 212° the deep red.

The black oxide has not as yet been introduced by the London College into their Pharmacopœia, but by the Dublin it has for for some years; their method of obtaining it being by sifting the scales from a blacksmith's forge. The product is, however, considered as not being a true oxide, but merely a mechanical mixture; and its production would appear to depend on a fact mentioned in Professor Kane's *Elements of Chemistry*, that the

red oxide, at an intense ignition in an open furnace, loses oxygen, and I have also found that it becomes slightly magnetic.

In the last edition of the Edinburgh Pharmacopœia it is ordered to be prepared by mixing a proto and persalt of iron, and precipitating the mixture by ammonia. This precipitate consists, according to Wöhler (Dr. Christison's *Dispensatory*) of a mixture of one atom of protoxide, and one atom of sesquioxide, and combines with, when dried at 180°, one atom of water. Liebig and Wöhler have, however, given a formula for the preparation of the oxide, by which it is rendered similar in its composition to the state in which it exists in the octochedral iron ore, viz. one atom of protoxide, and two atoms of sesquioxide; it is to calcine a mixture of chloride of iron and carbonate of soda: the product is to be washed with water, and is, when ignited and anhydrous, more magnetic than iron itself (Graham). By dissolving the oxide in hydrochloric acid, and precipitating by ammonia, the same Chemists obtained it as a hydrate, even when a flocculent precipitate was attracted by the magnet.

From the observations in the first part of this paper, it will be apparent that chlorate of potash and protoxide of iron, furnish us with a far easier method for the production of the black oxide than any of those I have mentioned, and I therefore performed the following experiments to ascertain its composition and properties when made in that manner:—I first mixed with the protoxide of iron obtained from the decomposition by ammonia of 417 grains of protosulphate of iron, 15.5 grains of chlorate of potash, the latter being the amount according to calculation that the protoxide would require to convert it into black oxide, supposing that a compound of the oxides, similar to that mentioned by Wöhler were formed. The precipitate was washed and dried at 212°, when it weighed 114.2 grains, which amount was not accordant with Wöhler's oxide, and that sufficient of the chlorate of potash had not been added, was evidenced by the fact that the parts of the precipitate exposed to the atmosphere became further oxidized; I therefore added, instead of 15.51 grains of chlorate of potash, 20.7 grains, the quantity required, if its composition were similar to the state in which it exists in the ore. The mixture was boiled, and the precipitate washed and dried at 212°, it then weighed 117.8; it was again dried and found not to have lost weight; and then placed in a Bohemian glass tube, to which was attached a small tube containing chloride of calcium. The Bohemian tube was heated in a charcoal furnace for nearly an hour; the oxide was found to have lost 2.8 grains in weight, and the chloride of calcium tube to have increased to that amount.

The oxide was then ignited in open furnace for some time,

when it increased in weight 4.5, its total weight then being 119.5. Now, according to calculation, supposing the oxide to become anhydrous at 212°, the weight of the precipitate (if it were similar in its composition to the ore), should have been 116, instead of 117.8 ; but as the last amount lost 2.8 water, the real weight of the oxide was 115, showing an error of experiment of one grain. 116 parts would, by calculation, become when ignited and converted into sesquioxide, 120 ; the actual weight, by experiment, was 119.5

In order to prove that the oxide was perfectly definite in its nature, I made a similar experiment to the last; but with the exception that I added, after the formation of the oxide, 20 more grains of chlorate of potash. The results were dried at 212°,weight, 117.5; loss of water, 2.2 ; weight after ignition in open furnace, 119.2 : thus proving it to be a definite compound. It was magnetic when first precipitated, after drying at 212°, and after ignition in the Bohemian tube : although, according to my observation, not as magnetic as iron itself; when heated in the open furnace, it entirely lost this property, the oxide itself not being permanent, as I found by experiment, at a temperature of about 350°, if exposed to the action of atmospheric air, but becoming converted into sesquioxide.

It has, when formed by the methods I have described, a slightly crystalline appearance, somewhat similar, although in an inferior degree, to the micaceous iron ore. Dissolved in hydrochloric acid, I found as Liebig and Wöhler had previously, that it precipitated again black, and was still magnetic, the action however of the hydrochloric acid would appear to separate the two oxides, as after precipitation they no longer remained unaltered by exposure to the atmospheric air, for the precipitate speedily attracted oxygen. I prepared from the chloride a tincture and syrup of equal strength to the tinctura ferri sesquichloridi of the Pharmacopœia, they remained without decomposition, but possessed, however, a disagreeable taste.

Craig's Court, January 20th, 1845.

NOTE ON THE MANUFACTURE OF TARTARIC ACID.

The directions of the London College for the preparation of this acid are, that bitartrate of potash be boiled with chalk. The chalk is decomposed, and a tartrate of lime and a tartrate of potash are formed. The former being almost insoluble is then separated and decomposed by sulphuric acid ; which acid, by forming sulphate of lime with the lime, leaves the tartaric acid free. The tartrate of potash left from the first decomposition is then mixed

with chloride of calcium, a double decomposition ensues, and a tartrate of lime being formed it is separated, and as in the previous experiment, decomposed by sulphuric acid.

Dumas, however, in his *Treatise on Chemistry applied to the Arts* (vol. v., page 305), states, that M. Desfosses has simplified the process, at the same time rendering it more economical, by substituting for the chloride of calcium (required to decompose the neutral tartrate of potash), the sulphate of lime resulting from the first operation; and he states that, after boiling the tartrate of potash with it for a few minutes, the latter was decomposed.

The Pharmacopœia does not state any process for the purification of the argols, or impure bitartrate of potash. The following is taken from Professor Brande's work, and stated by him to be practised at Montpellier:—"They are first dissolved in boiling water and crystallized; these crystals are then boiled with one-twentieth their weight of pipe-clay (and the same quantity of animal charcoal?), which absorbs the colouring matter, and falls as an insoluble sediment, the crystals of pure tartar separating afterwards upon the surface of the liquor, and upon the sides and bottom of the boiler. The term *cream of tartar* was originally applied to the imperfectly crystallized superficial crust."

The details of this process are described by M. Fizes, and it is still carried on upon the same plan.

POISONING BY TARTARIC ACID.

We quote the following report from the *Times* of December 19th:—

"On Tuesday, Mr. Wakley, M.P., held an inquest at the King's Arms, Rawstorne-street, Clerkenwell, on the body of William Watts, aged 24, a cab-driver, lately residing at No. 4, Brewer-street.

"Elizabeth Watts, widow of the deceased, stated that her husband complained of a cold on the 7th ult., and that he went to Mr. Charles Watkins's, druggist, Myddleton-street, to purchase two ounces of Epsom salts. After he had purchased the salts, he observed in the shop circular that there were tasteless salts, and asked the shopman, Mr. Peter Watkins, the brother and apprentice of Mr. Charles Watkins, to take back the Epsom, and give him one ounce of the tasteless salts in lieu of it. The shopman complied, as he imagined, and her husband returning home melted the supposed salts and drank them. His face instantly became as red as fire, and having exclaimed that he was poisoned, he became speechless. Her husband never after left his bed, where he died on the 16th ult.

"Mr. Broad, surgeon, stated, that he tested the drains that remained in the cup, and found that deceased had taken tartaric acid.

"Mr. Watkins, jun.—I cannot deny having made the mistake.

"Coroner (addressing Messrs. Watkins).—You had better retire to consider what reparation you can make the widow for the loss you have inflicted upon her.

"Messrs. Watkins retired, and after a short absence returned, when they

said that their means would not allow them to do more than pay the medical expenses consequent upon the melancholy catastrophe.

"Coroner (very indignantly).—Have you anything more to say?

"Mr. Watkins, sen.—No, Sir.

"Mrs. Watts recalled.—All she received from Mr. Watkins amounted to 2*s.* which he gave her mother when she informed him of their poverty. She obtained further assistance from the parish.

"The jury retired, and, after a short deliberation, returned a verdict of 'Manslaughter against Peter Watkins, jun.' who seemed little prepared for such a result.

"The Coroner wrote his committal, and he was conveyed to gaol in custody of Mr. Money, the summoning officer.

"The jury raised a subscription in behalf of the poor widow."

The verdict of the jury appears to us to be very severe. If the bottle was not properly labelled, the master ought to have been liable to censure and punishment. If the label was correct and distinct, the young man was decidedly to blame for not reading it, but we think it could not justly in either case be dealt with as manslaughter. We agree with the Coroner in thinking that the parties concerned should have made some pecuniary amends to the widow; but doubt his authority to insist upon it, or to prejudice the jury against the prisoner on account of his refusal.

At the trial, of which the following is the report from the *Times* of January 10th, the Jury acquitted the prisoner:

"Mr. Bodkin conducted the prosecution, and Mr. Wilkins the defence.

"The circumstances of this case have already been fully before the public in our report of the coroner's inquest held by Mr. Wakley, on the body of the deceased. The facts and cause of his death having been proved in evidence,

"Mr. Wilkins submitted that the drug had been supplied in error and mistake, and not with that gross and culpable negligence which would constitute the offence of manslaughter. To prove this, the learned counsel called

"Charles Watkins, the proprietor of the shop, and brother of the prisoner, who proved that on the night previous to the deceased being supplied with the drug, he (the witness) had transposed the usual positions of the bottle containing the tasteless salts and of the bottle containing the tartaric acid, and to this circumstance the fatal mistake was attributable.

"Mr. Justice Erle left it to the jury to say whether the death of the deceased had arisen from accidental mistake, or whether the prisoner had been guilty of gross and culpable negligence in serving and dispensing the drug.

"The jury, after a short deliberation, returned a verdict of *Not Guilty*, and accompanied their verdict with a recommendation that the labels attached to the bottles should be increased in size, so as to preclude the possibility of any mistake in future.

"Mr. Justice Erle admonished the prisoner to use more caution in transacting his business, and ordered him to be discharged."

The fatal result which has attended this unfortunate accident proves that tartaric acid, when taken in a sufficiently large dose, may act as a poison. Nearly thirty years ago Orfila, in his *Traité de Toxicologie*, enumerated tartaric acid among those acids which, when introduced into the stomach, are capable of

producing serious symptoms. But he adduced neither experiments nor cases to support his statement. In the last edition of his work, published at Paris in 1843, he refers to a fatal case of poisoning by four or five tablespoonsful of bitartrate of potash (related in the twenty-first volume of the *London Medical Gazette*), apparently for the purpose of supporting his assertion of the deleterious qualities of tartaric acid in large doses.

Pommer's experiments confirm Orfila's conclusions; for he found that solutions of tartaric acid, when injected into the blood, were scarcely less active than a solution of oxalic acid.

On the other hand, Drs. Coindet and Christison gave a drachm of tartaric acid, dissolved in water, to a cat, without observing that the animal suffered any inconvenience therefrom; and a patient of Dr. Sibbald took six drachms of the acid in twenty-four hours, without suffering any inconvenience. On the strength of these observations Dr. Christison declares that tartaric acid is not a poison (see the *Index*, p. 984, to his *Treatise on Poisons*, fourth edition, 1845.)

But while Pommer's experiments, and the fatal case of Watts under notice, sufficiently prove that tartaric acid is a poison, which, in the dose of an ounce, is capable of producing death, we are not authorised to conclude that it at all equals oxalic acid in potency. On the other hand, the every day experience of most persons, the experiments of Drs. Christison and Coindet, the observation of Dr. Sibbald, and even the present fatal case of Watts, may be quoted in proof of its inferior power. If we are to trust the account published in the *Times* newspaper, the deceased lived *nine days* after swallowing an ounce of tartaric acid. Now oxalic acid, when taken in an equally large dose, usually kills in a much shorter period of time, death being in general not prolonged beyond the hour. It must be admitted, however, that exceptions to this rule are by no means rare, and death may not occur for many hours after the poison has been taken.

On the whole, therefore, we are disposed to regard tartaric acid as a poison, only when taken in *excessive* doses. In the same way, common salt, Epsom salt, cream of tartar, sulphate of potash, and pepper, are poisons, though in small or moderate quantities, they are innocuous, or even salutary.

We doubt not that citric acid would prove equally deleterious with tartaric acid in ounce doses, and the same statement would probably apply to a host of other substances justly reputed wholesome when taken in moderate quantities.

Before leaving this subject, we beg to remind our readers, that the best antidote for the vegetable acids is chalk or whiting, which neutralizes these bodies, and, in the case of oxalic, tartaric, and citric acids, forms with them difficultly soluble, and, therefore, inert calcareous salts.

SULPHATE OF IRON, COMBINED WITH AN ALKALINE CARBONATE, AN ANTIDOTE FOR PRUSSIC ACID.

BY T. AND H. SMITH, EDINBURGH.

[*From the Lancet of October 5*, 1844.]

In a communication, dated 3d July last, which the *Lancet* did us the honour of inserting, we proved, we believe, that common sulphate of iron used by itself, was not possessed of the slightest antidotal action against the poisonous effects of prussic acid. We at the same time intimated our being engaged in some researches on this subject, an account of which, with their favourable result, we now beg to communicate to the profession, through the medium of your able journal.

More than a month previously to the date of the communication alluded to, we had found that a sulphate of iron of proper constitution, if added to a liquid containing prussic acid, with a proper proportion of an alkaline carbonate, instantaneously removed every trace of the prussic acid; and we only waited an opportunity to test the practical value of the observations on the living animal, before submitting it to the profession. Since that time, an opportunity has been found to prove it in this way, and we are happy in being able to say, that its efficacy on the whole, does not appear to admit of doubt.

The salt of iron, which we have used as the basis of the remedy, has the same constitution as Prussian blue, which it may be proper, without entering into the disputed question of its real constitution, to remind the reader contains seven equivalents of iron and nine of cyanogen, or, on the supposition that the cyanogen is replaced by oxygen, of three equivalents of protoxide and two equivalents of peroxide of iron. Thus,

$$3\ Fe\ O + 2\ Fe_2\ O_3 = 3\ Fe\ Cy + 2\ Fe_2\ Cy_3.$$

To prepare a salt so constituted, is an exceedingly simple process, and can be accomplished by any one, even with a very moderate knowledge of chemistry. For this purpose, seven parts of protosulphate of iron, say seven half-drachms are required, four of which are to be formed into persulphate. This is done by adding to the solution a quantity of sulphuric acid equal to the half of what it already contains—which for two drachms would be twenty three grains of acid of the density of 1.845—and at a boiling heat, adding at short intervals, small quantities of nitric acid, till red nitrous fumes cease to be given off. The liquid is then to be evaporated in a porcelain basin to perfect dryness, by the heat of a water-bath, stirring constantly with a glass rod, till the excess of acid is thoroughly driven off. The operation will be more quickly finished in a bath of a saturated solution of salt. The perfectly dry salt is then to be dissolved in distilled water along with one and a half drachms of protosulphate of iron, so that the solution may amount to two ounces. This solution will not of itself precipitate prussic acid, but if a solution of an alkaline carbonate be previously added, containing a quantity just sufficient to take all the sulphuric acid from the iron salt, the prussic acid combines instantaneously with the iron, forming the very permanent and insoluble compound Prussian blue. As the solution of the sulphate of iron contains in all nine equivalents of sulphuric acid, the same number of equivalents of carbonate of potash—the alkaline carbonate we use*—will be required to seize upon these and produce complete decomposition; it is therefore a very easy matter to determine the quantity of the alkaline carbonate necessary. The equivalent of the carbonate of potash

* The carbonate of potash, which ought to be used in the preparation of the antidote, is the carbonate obtained from pure crystallized bicarbonate of potash, by heating in a crucible to redness.

is 69.27, and nine equivalents of this is $69.27 \times 9 = 623.43$. The equivalent of protosulphate of iron is 130; of this, seven equivalents are needed to form a salt of the constitution indicated, therefore seven equivalents are found by multiplying $130 \times 7 = 910$. The relative quantities are consequently 910 grains of protosulphate of iron, and 623.43 grains of carbonate of potash. Now, as the quantity of sulphate of iron given in our formula was seven half-drachms, or 210 grains, the correct quantity of carbonated alkali can be found by the following proportion :—

910 : 623.43 : : 210 : 144.

Therefore 144 grains is the proper quantity for the exact decomposition of the iron salt; and for the sake of simplicity, we dissolve this in the same quantity of water as the sulphate of iron. As each of the solutions contains exactly 960 minims, which, by calculation, should throw down 56.8 grains of real prussic acid, between 17 and 18 minims of each should separate one grain ; and as the hydrocyanic acid of the London Pharmacopœia contains two per cent. of real acid, 35 minims of each would be required to precipitate 100 grains of such an acid. The acid of the Edinburgh Pharmacopœia, on the other hand, containing about three per cent., a third more, or about 52 minims of each of the solutions, would be necessary to separate all the prussic acid from 100 grains. It is probably unnecessary to carry the calculation higher, as we suspect that if a larger quantity than 100 grains should be taken, the fatal effect would be so rapid, as completely to exclude the possibility of rendering any available assistance. These are the quantities theoretically necessary, and when pure materials are used, will be found very nearly correct, as tested in an open vessel ; but when given as an antidote for the poison, we would recommend not less than three times the theoretical quantity to be given, as from the presence of food, mucus, &c., in the stomach, it is improbable that the antidote would mix immediately with the poison at every point, so that to render the action more certain, a large excess is advisable, more especially as this can be attended with no evil consequences, as the only effect that could follow an excess, would be the formation of sulphate of potash, and an insoluble mixture of protocarbonate and peroxide of iron, which, if active in any way, would, by producing sickness and vomiting, be really in the direction most to be desired.

There is one circumstance that may interfere with the action of the antidote, and which cannot be overlooked. We allude to the possibility, nay, the probability, of the existence of a strong acid in the stomach. In such a case, it is evident that the alkali, on entering the stomach, might be wholly neutralized, and thus prevent the decomposition of the iron salts; but we have found that the prussic acid is completely precipitated by the method proposed, although a large quantity either of caustic or carbonated magnesia is present, so that nothing is more easy than at the very outset to give the patient a large dose of magnesia in either state, so as thoroughly to neutralize all free acid ; but when this is not possible, it is not meant that the antidote should not be given. We gave magnesia in none of our experiments.

The mutual decomposition resulting from the mixture of the alkaline carbonate, and the mixed sulphate of the protoxide and peroxide of iron, in the quantity of two ounces of each, would produce 179 grains of sulphate of potash, 37 grains of peroxide of iron, and 40 grains of carbonate of the protoxide of iron, so that two drachms of each of the liquids, being the eighth of that quantity, would give

$\frac{179}{8} = 22.4$ grains of sulphate of potash,
$\frac{37}{8} = 4\frac{1}{2}$ grains of peroxide of iron, and
$\frac{40}{8} = 5$ grains of protocarbonate of iron.

Now, as with prussic acid of three per cent., two and a half drachms of each of the liquids is three times more than what is theoretically necessary to destroy 100 grains of the poison, no fear need be entertained of any evil

effects resulting from the quantity of the antidote required in cases where a large dose of the poison has been given.

We first thought of keeping the alkali and compound salt of iron in the dry state; but as both of these are very deliquescent, and consequently continually liable to change in their strength, it would have been impossible to fix on the weight of each required for mutual decomposition, besides that the state of solution is best fitted for obviating delay in its administration.

In all our experiments, we have used one drachm of each of the liquids for every thirty drops of prussic acid, which is about four times the quantity theoretically necessary, and we would recommend that there should never be less given than one drachm of each for every thirty drops of the acid supposed to be taken; and from the harmless nature of the compounds resulting from the decomposition, we think it would not be unadvisable to give much more than that proportion, so as to assist the desired decomposition by a great excess of the decomposing agents.

In giving the antidote, we always give the alkaline solution first, having previously mixed it with a little water, we would therefore propose that the alkaline liquid should be labelled

PRUSSIC ACID ANTIDOTE,

No. 1.

SOLUTION OF CARBONATE OF POTASH.

The solution of the iron salts, also diluted, is next given without delay. This liquid we would further propose, should be marked

PRUSSIC ACID ANTIDOTE,

No. 2.

SOLUTION OF PROTO-PERSULPHATE OF IRON.

Our first thought of the antidote arose from a consideration of the nature of the test proposed by Scheele for prussic acid; but in applying it as an antidote for the acid in the human stomach, it was necessary to learn if a carbonated alkali could be substituted, as it is evident, if a caustic alkali were required, this being itself a corrosive poison of no mean energy, its use must on that account have been completely precluded. We found, as already stated, that in an open vessel containing prussic acid, this was completely and instantaneously removed by a salt of iron of the same constitution as Prussian blue, and enough of a carbonated alkali to combine with all the acid of the iron salts. We also tried the black pulpy hydrated oxide of iron, precipitated from a salt of iron, of the constitution indicated; but although, on mixing this with a liquid containing prussic acid, a singular commotion occurred, yet we found that the acid still remained in the liquid. We therefore fixed on the form of the antidote which we have proposed.

To test the antidote on the living stomach, we made experiments on dogs, an account of which we will now give.

The prussic acid was tested before commencing the experiments. Thirty-three grains gave a fraction more than five grains of cyanuret of silver, answering to a trifle more than three per cent., which is the strength of the medicinal acid of the Edinburgh Pharmacopœia; the same acid was used in all the experiments. The animals were all below the middle size, and as nearly as possible of the same strength. The subject of the first experiment was the largest, and of the fourth and sixth the smallest. The different articles were conveyed into the stomach through an œsophagus tube effectually protected by a gag. In all the experiments, Mr. Spence, teacher of anatomy in this city, was so obliging as to give us his able assistance: it is right that he should be thanked by us publicly and cordially.

July 22*d.*—First dog. Forty drops of the acid given. The dog was dead in seven minutes.

Same date. Second dog. Forty drops were given. From an obstruction in the tube, a delay of about five minutes occurred before the antidote could be given; a considerable quantity of the antidote was also lost from regurgitation. Before this period, the dog was evidently dying. It was dead in about fifteen minutes.

July 25*th.*—Third. Gave thirty drops, and followed this at once with the antidote. The animal seemed to suffer little inconvenience, and ate heartily about an hour after,

Same date.—Fourth dog. Thirty drops were given, and allowed to remain on the stomach one-and-a-half-minute, and the antidote was then given. About four minutes after this violent and repeated vomiting occurred, but the animal gradually revived, and in about an hour after, greedily devoured a mess of brose—a Scotch dish, being a mixture of oatmeal and water stirred rapidly together.

July 27*th.*—Fifth experiment. The dog used was the same as had formed the subject of the third experiment. Thirty drops were given. In a minute and a half, the antidote followed; but on examination, it did not appear to have passed into the stomach; and on withdrawing the tube, it was found to be completely full of the liquids, in consequence of the lower opening having become perfectly plugged with the pasty contents of the stomach. The subject of this experiment had got a hearty meal six hours previously. Prussic acid was ascertained to have been left in the tube, but some of the poison must have got into the stomach, as the dog very soon showed the usual symptoms of poisoning with prussic acid. In about four minutes, it vomited an abundant mess of oatmeal. The usual remedies were applied—dashing cold water upon the animal, applying ammonia, the jugular vein having been also opened by Mr. Spence, notwithstanding which, life was quite extinct in the course of two hours.

July 30*th.*—Sixth experiment. This dog had previously served for the fourth experiment. It showed the most extraordinary symptoms of terror, when bound on the table. Its whole muscular system was in an unceasing tremor, and its pulse beat very low. No doubt, the recollection of the previous experiment was vividly present to the animal. Thirty drops of the acid were allowed to remain on the stomach for one minute, and then the antidote was given. Symptoms of poisoning soon appeared; in eight minutes it vomited a small quantity of a brown, glairy liquid; after which, it appeared very much exhausted, and was unable to stand on its legs; it lay on its side for about an hour, all its limbs trembling and starting occasionally, and the respiration very rapid, the symptoms appearing more the result of terror and the severe shock the whole system had sustained, than a manifestation of the effects of the prussic acid poison. It then raised its head and looked around with an intelligent eye, appearing to seek for something, and on giving it some food, it ate ravenously. After which, it rose up on its legs and shook itself, and thereafter continued quite well, and without a single morbid symptom. We may remark, that we used the precaution in all the dogs, except that which formed the subject of the fifth experiment, of giving no food for twenty-four hours before being subjected to experiment.

August 5*th.*—Seventh experiment.—The œsophagus of this dog was cut down upon by Mr. Spence, and a tube passed into the stomach. The œsophagus being then tied to the tube, the usual dose of the poison was given, and in three minutes followed by the antidote. The tube was now withdrawn, a ligature at the same time applied, and life was instantly extinguished by spining the animal. The stomach was immediately removed, a ligature having been first attached to the duodenum and cardiac orifice. The contents of the stomach, free from the odour of prussic acid, being filtered, the filter retained a greenish matter, which, on being acted on with pretty strong

nitric acid, left Prussian blue in considerable quantity. The filtered liquid was, within an hour, introduced into a retort, and about an eighth distilled over. The distilled liquid had no odour of prussic acid, gave no precipitate with nitrate of silver, and no indication of prussic acid with Scheele's test. Every trace of the poison had been destroyed by the antidote.

It must be confessed that there are cases of poisoning by prussic acid where neither the antidote proposed, nor any other mode of treatment could be of the least avail; but we can also conceive cases in which it may be the means of saving life. We may point to the case of a person using prussic acid as a medicine, and either himself, or some person living within the same house, taking an overdose by mistake. In such a case, if he had previously provided himself with the antidote, by taking it instantly, he might, with perfect certainty, calculate on escaping the dangerous effects of the poison. We would urgently advise medical men never to prescribe prussic acid without seeing that the antidote goes along with it, as well as directions for using it. Other cases can be conceived, in which medical men might advantageously avail themselves of its use. In no case of poisoning by prussic acid, should it, if possible, be omitted, as it is sure to destroy the whole of the poison still left in the stomach, so that any harm which can arise from this will be wholly obviated, and unless the attack on the vital organs has already been too serious to be remedied, the person's life will be saved. Other approved means of treatment also should not be neglected, and especially bleeding freely from the jugular vein; but these are points which we think will be best left to the judgment of medical men.

We do not, for one moment, conceive the remedy we have proposed to be infallibly successful as an antidote in all cases of poisoning by prussic acid. It stands, in this respect, on the same ground as our most valuable remedies. Its success must vary with circumstances peculiar to each case. It is very obvious that this, like every other remedial agent, however valuable, will frequently fail of the desired effect, simply from being too late of being applied. How completely, for instance, in certain cases of acute inflammation, can the medical man arrest its progress, if called in at its first invasion; on the contrary, if not called in till a comparatively late period, what can he do but look on, and contemplate, with mournful regret, the successive steps of the disease into a disorganization of the part or organ, so serious as to be incompatible with life, or at least with healthy action. Another case may be given in illustration. A person is bleeding to death from the rupture or wound of a blood-vessel. A skilful surgeon applies a ligature; the issue of blood is instantly stayed, notwithstanding which, the person sinks and dies. And what cause can be assigned for this, except that the vital current has, before the application of the ligature, flowed from the vessels to an extent which, although not instantly fatal, has been too great for ultimate recovery; in other words, the remedy has not succeeded, because it has been too late applied.

If we have placed in the hands of medical men an instrument which shall be the means of saving a single life, we shall consider ourselves amply rewarded for any time we have devoted to this investigation.

We remain, Sir, your obedient Servants,

Duke Street, Edinburgh, Aug. 6, 1844. T. & H. Smith.

EXAMINATION OF A SPECIMEN OF DISEASED WHEAT.

BY MR. J. CARTY.

My attention was lately directed by Mr. Briggs, of Overton, near Wakefield in Yorkshire, to a kind of disease which he considers to be burnt ear, and analogous to smut, which had attacked some wheat growing on his land. The stalk of the wheat was of the usual height and strength, and

the ears seemed externally healthy; but on breaking into the grain it was found to be filled with a black powder, instead of the white thick juicy substance found in healthy wheat at the same period of growth. It was a thick-set red wheat, sown in December on a light and good turnip soil, to which an unusually large quantity of guano (4 cwt. per acre) had been applied as a manure. About one-tenth of the whole quantity was diseased, while several other kinds of wheat, sown in the same field, but to which no guano had been applied, were perfectly sound.

The ears had a much greener appearance than the same kind of wheat in a healthy condition, and emitted a very disagreeable smell, which is not easily described.

On close examination the grains were found filled with a black unctuous powder in place of the milky pulp of the healthy seed. This powder was separated in quantity by bruising the ears in a mortar and sifting through fine muslin, and submitted to chemical examination. It had the same disagreeable smell as the ears, but stronger; it was oily to the touch, and heavier than alcohol and water. When heated in the air it burned with a bright flame, leaving a residue of charcoal, and eventually a trace of white ash. When heated in a tube, it gave off water, empyreumatic and oily matters, and a little ammonia. It was insoluble in a solution of potash and in hydrochloric acid; nitric acid made it yellow, and hot sulphuric acid dissolved it with purplish-red colour. Boiled with water, it yielded merely a little gum and bitter brown extractive matter, the greater part remaining undissolved. Alcohol extracted a fat oil, and a waxy or resinous matter; the undissolved portion appeared to consist of lignin mixed with charcoal. The black powder greedily absorbed oxygen from the air when in a moistened condition, giving rise to carbonic acid.

A carefully conducted proximate analysis of the substance led to the following results :—

Wax or resin with fixed oil.	7.0
Gum and extractive matter, &c.	7.8
Lignin and charcoal	82.7
Ashes	2.5
	100.

The ash consisted chiefly of earthy phosphates and silicate of potash.—*Memoirs and Proceedings of the Chemical Society.*

A NEW METHOD OF PREPARING MERCURIAL OINTMENT.

BY OROSI.

The iritation of the skin so frequently produced by blue ointment, prepared in the old way, led Orosi to the idea of using precipitated metallic mercury with fresh lard. The reduction of the salts of mercury to the metallic state, is as is well known effected by phosphorous acid or proto-chloride of tin; the latter of which is employed by Orosi. He dissolves 1 lb. of corrosive sublimate in a sufficient quantity of boiling water, and mixes an excess of proto-chloride of tin, with an addition of muriatic acid, with the solution : the mixture is now shaken at a moderate temperature for a short time, and the finely divided grey mercury is allowed to settle. When the fluid is poured off the precipitate should be well washed with warm water, dried between bibulous paper and then mixed with the prescribed quantity of fresh lard. The fine state of division of the precipitated mercury renders this preparation of the ointment very expeditious. The only difficulty encountered in this method is the readiness with which the precipitated grey mercury forms metallic globules, especially if the

precipitate be allowed to stand too long, and dry after pouring off the fluid. This union of the globules may however be prevented by covering the interior of the vessel in which the mercury is precipitated with fat.

Ointment prepared on Orosi's plan, exhibits no globules of metal under the lens, and can at the most only contain a trace of oxide of tin, if sufficient muriatic acid be not employed in the preparation, or the precipitate be inadequately washed. Ointment prepared in this way is certainly more expensive, but is free from all rancidity and does not require much rubbing down.—*Gazzetta Toscana della Science Medico-fisiche in Buchner's Repertorium.*

ON SOME OF THE SUBSTANCES WHICH REDUCE OXIDE OF SILVER, AND PRECIPITATE IT ON GLASS IN THE FORM OF A METALLIC MIRROR.

BY JOHN STENHOUSE, PH.D.

It has long been known that aldehyde, when heated in a tube with ammonio-nitrate of silver, reduces the oxide to the metallic state, and forms a brilliant coating on the inner surface of the tube. Three other substances, saccharic acid, salicylic acid, and pyromeconic acid, were also known to possess the same property, though the coatings which they yield are much darker, and therefore less beautiful than those formed by aldehyde. This was the state of our knowledge previous to the announcement, about six months ago, of Mr. Drayton's process for silvering mirrors in the cold, by means of ammonio-nitrate of silver and an alcoholic solution of the oils of cloves and cassia.

I find that the number of substances which, especially when assisted by heat, give more or less brilliant coatings of reduced silver, is much greater than has hitherto been supposed. Thus grape-sugar forms a pretty brilliant mirror even in the cold. When unassisted by heat the mirror is rather slowly formed, requiring from six to twelve hours; but when a slight heat is applied it forms very readily in the course of a few minutes; the coating is much darker than that produced either by aldehyde or by Drayton's process. Cane-sugar also yields a mirror when assisted by heat, but none in the cold. Gum-arabic and starch also yield dark coloured mirrors, but more slowly, and require considerable boiling: so do phloridzine and salicine. Oils of turpentine and laurel also give mirrors, but with still greater difficulty, the solutions requiring to be very concentrated. Resin of guaiacum acts in a similar manner.

Oil of pimento, as is well known, consists of two oils, one an acid oil, which is heavier than water, and forms crystalline compounds with the bases; this in the course of a few minutes, even in the cold, produces as brilliant a coating of silver as the mixture of the oils of cassia and cloves. The neutral portion of the pimento oil, which is lighter than water, does not reduce nitrate of silver even after long boiling. I could not succeed in forming metallic mirrors with cinnamic, benzoic, meconic, komenic, tannic or pyrogallic acids, with gum benzoin, elemi or olibanum, with oil of rhodium or with glycerine.

Ingenious as Mr. Drayton's patent process certainly is, it labours under a very serious inconvenience, which I greatly fear will not be easily remedied. In the course of a few weeks the surface of the mirrors formed by his process become dotted over with small brownish red spots, which greatly injure their appearance. The cause of the spots seem to be this:—That the metallic silver while being deposited on the surface of the glass carries down with it mechanically small quantities of a resinous matter, resulting, most probably, from the oxidation of the oil. This resinous matter, which

is interposed between the glass and the silver, in the course of time begins to act on the metallic surface with which it is in contact, and to produce the small brown spots already mentioned. If an excess of the essential oils is employed to precipitate the silver, the metallic mirror is much darker, and gets sooner discoloured than usual. No doubt the alcohol present in the solution keeps up much of the resinous matter; still a little of it is almost always deposited on the silvered surface, and acts in the injurious way described.—*Memoirs and Proceedings of the Chemical Society.*

[Mr. Drayton informs us, that the brown spots noticed by Dr Stenhouse occur only when the oil employed is old and unfit for use. Old oil of cassia, for instance, is liable to this objection. In some of his early experiments, Mr. Drayton found a difficulty in overcoming this obstacle, but he can now easily obviate it by a proper selection of the oil, and attention to a few minor details of manipulation, which experience has shown to be important. It is also necessary to protect the back surface of the silver with a varnish, which by effectually excluding the air, or any other agent, which might act upon the metal, preserves it in its original brilliant state.—Ed.]

ON THE ANALYSIS OF GUANO.

BY ANDREW URE, M.D., F.R.S., &c. &c.

(*Continued from page* 261).

5. For distinguishing and separating the soda salts from those of potash, I tried the antimoniate of potash, according to Wackenroder's prescription, but I found reason to prefer very much the crystallised soda—chloride of platinum, for that purpose.

6. From another specimen of the Bolivian guano, I extracted 3.5 per cent. of the ammonia-phosphate of magnesia.

B. A sample of guano from the Chincha Islands, of nearly the same light colour as the preceding, and the same dryness, being an early importation of 250 tons in the present year, was subjected by me to a careful analysis.

1. The solution in water of this guano had an alkaline reaction from carbonate of ammonia, which, being neutralised by test acid, indicated 0.34 per cent. of ammonia, equivalent to about 1 of the smelling sesquicarbonate.

2. Of this guano, 47 per cent. were soluble in water, and 53 per cent. remained, after drying at a heat of 212° F. Of the above 47 parts, 3.5 were moisture in the guano.

3. The solution being acidulated with nitric acid, was treated with acetate of barytes, in a quantity equivalent to the sulphuric acid present, and it afforded 12 parts of sulphate of barytes. With the filtered liquor, 700 water grain measures of ferric acetate were mixed, and then ammonia in excess; 18.5 parts of washed and ignited subphosphate of iron were obtained, from which 8.8 parts present in the acetate being deducted, 9.7 remain as the quantity of phosphoric acid; but 9.7 of acid produce 13.25 of biphosphate of ammonia, which contain only 2.3 of ammonia, combined with 0.95 of water, or its elements. From the alkaline excess in the guano, there can be no doubt, however, that it contained the subphosphate (*found in the urine of Carnivora*), and not the biphosphate of that base. In this case, 9.7 of acid produce 14.32 of dry saline compound, containing 4.62 of ammonia, which, with the 0.34 of ammonia in the carbonate, constitute a sum of 4.96. To the liquor freed from the phosphate of iron, and acidulated with nitric acid, acetate of lime being added, 3.33 parts of oxalate of this base were obtained, which are equivalent to 3.23 oxalate ammonia, containing 0.89 of ammonia.

4. Nitrate of silver now produced from the filtered residual solution 8 parts of chloride, corresponding to nearly 3 of sal ammoniac, which contain nearly 0.95 of ammonia.

5. The 53 parts insoluble in water were digested with the solution of borax at a boiling heat, thrown on a filter, and the uric acid being precipitated from the filtrate by means of a little hydrochloric acid, washed and dried, was found to weigh 13.5 parts. There were left on the filter 36.5 parts, dried at 212° F., so that 3 parts of soluble organic matter had passed through the filter. These 36.5 parts lost by ignition only 9.7 parts in organic matter, became white, and afforded a very faint effervescence with hydrochloric acid, showing that a very little oxalate of lime had been present. 1.25 parts of silica were left after the action of the acid. To the solution of the 26.55 parts, sulphuric acid was added, and the mixture being heated to expel the hydrochloric and excess of sulphuric acids, the residuary matter was digested and washed with dilute alcohol, and thrown on a filter; the solution of magnesia passed through, while the sulphate of lime remained. After ignition, this weighed 27.5 parts, equivalent to 22 of subphosphate of lime. On supersaturating the filtrate with ammonia, 4.5 parts of the magnesian ammonia-phosphate were precipitated, containing 0.32 of ammonia. With the 13.5 parts of uric acid, 1.23 of ammonia had been originally combined, forming 14.73 of urate.

6. 25 grains of the dry guano afforded, by ignition in the combustion-tube along with 200 grains of the mixed lime and hydrate of soda, 4.165 of ammonia, which correspond to 16.66 in 100 parts of the dry, or to 15.244 in the natural state; leaving therefore 5 parts for the quantity of potential ammonia, or of ammonia producible from the decomposition of its azotized organic matter. This guano is therefore well adapted to promote permanently the fertility of a soil. It yields besides to alcohol a notable quantity of urea, which I did not think it worth while to determine quantitatively, and from which undoubtedly a portion of the ammonia proceeded, in the distillation with milk of lime.

7. 100 parts afforded by distillation with milk of lime, 10.2 of ammonia.

8. The total constituents of that guano, being tabulated, are—

1. Matter soluble in water	47.00	
consisting of—		
1. Sulphate of potash, with a little sulphate of soda	6.00	Ammonia
2. Muriate of ammonia	3.00	0.95
3. Phosphate of ammonia	14.32	4.62
4. Sesqui-carbonate of ammonia	1.00	0.34
5. Sulphate of ammonia	2.00	0.50
6. Oxalate of ammonia	3.23	0.89
8. Water	8.50	
9. Soluble organic matter and urea	8.95	
	47.00	
II. Matter insoluble in water	53.00	
consisting of—		
1. Silica	1.25	
2. Undefined organic matter	9.52	
3. Urate of ammonia	14.73	1.23
4. Oxalate of lime	1.00?	
5. Subphosphate of lime	22.00	
6. Phosphate of magnesia and ammonia	4.50	0.32
	53.00	9.80

The remaining 1.25 of *actual* ammonia may be fairly traced to the partial decomposition of the urea during the distillation with lime; and the 5 per cent. of potential ammonia proceeded from the transforming decomposition of the uric acid.

C. Foliated guano, from Peru, in caked pieces, the layers very thin,

parallel, and interspersed with white streaks. This guano was somewhat dense for a pure specimen, having a specific gravity of 1.7. The insoluble matter afforded by digestion with borax water, no less than 25.2 per cent. of pale yellow uric acid; 9 of other combustible organic matter, and 15 of earthy matter; consisting of silica, 3.5; phosphate of magnesia and ammonia, 6.5; and only 5 of subphosphate of lime or bone earth. It lost 10 per cent when dried in a heat of 212° Fahr. The remaining 30.8 parts soluble in water had a strong acid reaction, and afforded by ferric acetate and ammonia 6 of phosphoric acid, equivalent to 9.7 of crystallized biphosphate of ammonia, after acetate of barytes has separated the sulphuric acid. No less than 17 parts of chloride of silver were obtained, by precipitating with nitrate of silver the liquor filtered from the phosphate of iron, and acidulated with nitric acid. As the present is an accidental sample, and not an average of any importation, I did not prosecute the research further.

D. *Chincha guano*, of a somewhat darker colour than the preceding, and alkaline reaction; specific gravity, 1.62. Digested with water, and strained, 56.75 parts remained after drying it at 212° Fahr. The solution, evaporated and dried also at 212°, afforded 31.25 of saline matter. This saline mass being mixed with four-fifths of its weight of slaked lime, nine times its weight of water, and distilled, afforded of ammonia 14.28 per cent. Some Chemists have prescribed potash instead of lime, for separating the ammonia in distillation; but no person of intelligence who has made the experiment will choose to repeat it, because the potash forms with the organic matter of the guano a viscid compound, that froths up like a mass of soap-bubbles and coming over with the vapours, obstructs and vitiates the result.

2. When dried altogether by a steam heat, 100 parts lost 12 in moisture; whereas, by evaporating and drying the soluble matter by itself, the loss amounted to 16.3, no doubt by the dissipation of some of the ammoniacal salts, for 100 parts of the entire guano afford, by distillation with quicklime, 9 parts of ammonia, and by the transforming decomposition with hydrate of soda and lime 16.25, indicating 7.25 of *potential* ammonia, in addition to the 9 of ready formed. The insoluble matter of 100 parts afforded to borax water a solution containing 16.5 of uric acid, corresponding to 18 of urate of ammonia. There remained on the filter, after drying it at 212° Fahr., only 33.8 parts; so that about 5 parts of soluble organic matter had passed through the filter in the borax water. These 33.8 consisted of subphosphate of lime 17, magnesian phosphate of ammonia 5.5, silica 0.7, and combustible organic matter 10.6

The ammonia in the soluble portion was in the state chiefly of phosphate; there was merely a faint trace of oxalate of ammonia.

E. *African guano.*—Among the many samples of African guano which I have had occasion to analyze for the importers, none has contained any appreciable quantity of uric acid, or of consequence of potential ammonia. The best afforded me 10 per cent. of ready-formed ammonia, existing chiefly in the state of a phosphate, though they all contain carbonate of ammonia, and have of consequence an alkaline reaction. The said sample contained 21.5 of moisture, separable by a heat of 212° Fahr. Its specific gravity was so low as 1.57, in consequence of the large proportion of moisture in it. It contained 23 per cent. of subphosphate of lime, 3 of magnesian phosphate of ammonia, 1 of silica, and 1.5 of alkaline sulphate and muriate. The remaining 50 parts consisted of decayed organic matter, with phosphate of ammonia, and a little carbonate, equivalent to half a grain of ammonia, which is the largest quantity in such guanos. Other African guanos have afforded from 24 to 36 of moisture; no uric acid; no potential ammonia; but decayed organic matter; from 5 to 7 of ready formed ammonia in the state of phosphate, with a little carbonate; from 25 to 35 per cent. of subphosphate of lime; 5 or 6 of the magnesian phosphate of ammonia; more or less oxalates from the decomposition of the uric acid, and 3 to 5 per cent. of fixed alkaline salts.

[*To be continued.*]

ROYAL INSTITUTION.

FRIDAY EVENING MEETINGS.

Professor Faraday commenced the Session on Friday evening, the 17th of January, with an account of the recent explosion at the Haswell collieries, and the means proposed by himself and Mr. Lyall for preventing similar accidents in future. The explosion was attributed to the circumstance that while the usual precautions had been taken to ventilate the mine generally, that ventilation had not been effectual in removing the firedamp from the *goaf*, which is thus described in the report of Messrs. Faraday and Lyall * to the Secretary of State.

"The *goaf* is a mass of ruins in the middle of the works, growing from day to day, as the workings of the mine extend. The miner, as he works in the undisturbed coal (which is called the *whole*), removes it, so as to form passages which are usually parallel to, and at right angles with each other; the square portions of coal left between them are called *pillars*; the passages or ways are, upon the average, about five yards wide, and the pillars are about 16 yards by 22 yards; the pillars, whilst they remain, support the roof, and the superincumbent rocks and strata. This part of the works is called the *broken*.

"Afterwards the coal of the pillars has to be removed, and as it is carried off, the roof so exposed is supported by many wooden props; this state of things constitutes a *jud*: at last these props are withdrawn, and this is called *drawing a jud*; during or after which the roof falls in masses, larger or smaller according to circumstances, a fall being sometimes many tons in weight. The pillars are not removed indifferently, but those next the mass of ruins already formed are taken away first, so that the first *jud* which is drawn produces a heap of broken strata, and this increasing with every succeeding jud that is removed forms the *goaf*.

"These goafs grow to a great size. There are three in the Haswell Little Pit; two are small as yet; the largest has an extent of 13 acres. At the edges they are very loose and open, having accidental cavities and passages for air running into them, as might be expected from the falling of rocks from a height of five feet one upon another."

From this description it is evident that the interstices of the *goaf* may be for a considerable time filled with inflammable gas, which, being lighter than the atmospheric air, ascends to the upper part of it, and is not displaced, or driven into the shafts of the mine, except by some accidental current of air which may influence it, or by the falling of a further portion of the roof as the excavation proceeds. The vein of coal in the Haswell mine is five feet five inches in thickness. It is not horizontal, but dips about one foot in twenty-four. When therefore a fall takes place at that end of the *goaf* which is the highest, it is obvious that the level is raised one foot for every twenty-four feet of roof which falls in. If therefore the *goaf* at the time be filled with

* For a copy of the Report, see *Phil. Mag.* for January, 1845, p. 16.

inflammable gas, that portion of gas which was previously below the level produced by the fall, must escape into the shaft of the mine, in the same manner as a portion of the gas in a receiver escapes when the receiver is lifted a little on one side. Mr. Faraday illustrated this fact by several very conclusive experiments, and then proceeded to describe the proposed remedy, which consists in the introduction of a ventilating pipe as far up the cavity of the *goaf* as may be found practicable: this pipe is continued along the passages, and enters the flue of the furnace, which is kept constantly burning for the purpose of ventilating the mine. As this pipe is supposed to ascend from sixteen to twenty feet in the *goaf*, that space would be interposed between the level of the inflammable air, and the level of the wholesome atmosphere of the passages; and as the fall of the roof could not at one time alter the level more than two or three feet, such an event could not, while the ventilating pipe was in effectual action, occasion the escape of any foul air into the passages. Mr. Faraday illustrated the remedy by means of a bent pipe leading from an inverted receiver filled with coal gas and terminating in the chimney. The gas was speedily removed, and from this, as well as other well-conducted and satisfactory experiments, no doubt could exist as to the probable efficacy of the plan..

REVIEWS.

A Treatise on Poisons, *in relation to Medical Jurisprudence, Physiology, and the Practice of Physic.* By Robert Christison, M.D., F.R.S.E. *Fourth edition*, pp.986. Adam and Charles Black, Edinburgh.

Dr. Christison's was the first original and systematic work, published in this country, on Toxicology; and it has held, and still holds, the highest position among the books which have appeared on the subject. It may be said to be a digest of all the facts that have been established with reference to the science of which it treats; and in this respect is probably not less complete than the Treatise on Poisons of the celebrated Orfila. The present edition, which has been much called for, as the work has been for some time out of print, contains a great deal of new matter; indeed, it would naturally be expected that, during a period of eight years, the time which has elapsed since the last edition was published, many new processes for the detection of poisons, and new facts connected with the treatment of cases of poisoning, must have been discovered, that would require to be included in a work professedly so comprehensive as this. Ac-

cordingly we find that the section devoted to arsenic has been considerably extended; that many additions have been made to those on sulphuric acid, corrosive sublimate, lead, and opium; and that a notice of the action, and means of detection of cyanide of potassium, has been introduced. These and other additions have increased the size of the volume more than a hundred pages. But the author says, "He trusts it may be allowed him to express his satisfaction at finding, that the rapid progress made by toxicological science during the last eight years, while it has been productive of many important additions to our knowledge, has, nevertheless, not rendered any important alterations necessary either in the general principles formerly laid down in this work, or in what had been there stated as well ascertained general facts."

It is unnecessary for us to enter into any detailed description of a work so well-known and justly appreciated as this is. It has formed the model as to arrangement, and, no doubt, furnished much of the matter of some of the smaller treatises which have been published on toxicology. Some of these we have recently noticed as useful text-books for the student, and manuals to refresh the memory of the medical practitioner; but without intending to depreciate these for the purposes for which they are designed, it is not too much to say, that Dr. Christison's Treatise is the only *complete* work on the subject in our language, and is indispensable to those who desire to study Toxicology in all its details. The numerous foot-notes, referring to authorities and original papers from whence much of the information has been derived, greatly enhance its value as a work both of study and of reference.

MODERN COOKERY, *in all its Branches, reduced to a System of easy Practice, for the use of Private Families, in a Series of practical Receipts, which have been strictly tested, and are given with the most minute exactness. By* ELIZA ACTON. *Illustrated with numerous Wood-cuts.* Small 8vo., pp. 683. London: Longman and Co.

THE science of cookery, like other sciences, advances with the times, and Dr. Kitchener's book having held the first place for many years, is succeeded by the one now before us, which comprises a variety of modern improvements and inventions, French as well as English. We shall not enter into any minute description of the work, but we cannot do otherwise than recommend it in general terms, as a complete treatise on a science, which, if not allied to Pharmacy, is unquestionably, a valuable auxiliary.

TO CORRESPONDENTS.

E. B.—None of the barks sent are referable to *grey* or *silver cinchona*. No. 2 resembles *cusco cinchona*. E. B. is correct as to the typographical error at p. 1383 of the work named. With regard to the senna leaflets, our Correspondent ought to know that much confusion and discrepancy exists with respect to the plants from which the commercial leaflets are derived. In the paper referred to, we followed the names used by Nees von Esenbeck. All the specimens sent may, for aught we know, be the produce of the same species. Botanists cannot settle this point by reference to picked leaflets. No. 1 leaflets resemble *cassia acutifolia* of Delile, and are closely related in form to the *C. elongata* of Lemaire-Lisancourt, if indeed they be not identical. No. 2. *may be C. æthiopica*. No. 3. probably the same. No. 4. Some of the leaflets resemble those of Hayne's *Cassia obovata*, others belong to No. 3. Questions of this kind should be accompanied with the name of the Correspondent.

Mr. Clift.—We cannot tell how soon the next edition of the Pharmacopœia will be published by the College. We have no reason to expect it within twelve months.

Lactic acid has been proposed by Magendie as a remedy in some cases of dyspepsia. From one to two drachms may be taken during the day.

M. P. S.—Several editions of *Phillips's Translation of the Pharmacopœia* of 1836 have been published. We believe no material alteration has recently been made. There is no fixed period for the publication of a Pharmacopœia.

"Censor."—See the above. We have never seen or heard of *Taylor's Translation of the Pharmacopœia*: we recommend Phillips's.

"Amateur" and N. M. are informed that the *erratum* which they notice in page 183 of *Mr. Fownes's Manual of Chemistry*, arose from the transposition of the wood-cut by the printer. It has been corrected by Mr. Fownes, excepting in a few copies which had been issued before it was observed.

"Electron" mentions the fact that when brown paper is warmed and rubbed with the sleeve of a coat or a handkerchief, it becomes electric, and many sparks may be taken from it.

"An Associate" inquires (1.) whether sp. vin. rect. is more injurious than gin and water when diluted to the same strength. [Probably not, but we cannot recommend either mixture as a beverage.]—(2.) The purity of spirit of wine, in regard to the oil of corn spirit, may be tested by the action of oil of vitriol, which, when added to the spirit, colours it red, if the oil be present; or by nitrate of silver, a solution of which added to the spirit, and the mixture exposed to the direct rays of the sun, produces a similar appearance. —(3.) Mr. Warington's paper, On the Adulteration of Tea, pages 34 and 87 of this volume, contains the information respecting the mode of detection.—(4.) *Parnell's Chemical Analysis.*

"Amicus, M.P.S."—We have given several formulæ for show-colours: vol. iii., pages 94, 143, 192, vol. iv., page 340. We intend to give another article on the subject when we have time to complete the needful experiments.

"An Associate."—See the above. Some of the colours alluded to are not likely to freeze, unless at a very low temperature.

A. T. Q. wishes to know what composition is used for covering the PATENT LEATHER, and also the best elastic waterproof varnish (not caoutchouc) for GAS BAGS.

T. L. desires a formula for a STRONG BLACK DYE for straw-plait.

P. B.—(1.) Decoctum Cinchonæ deposits a sediment on cooling which should not be separated.—(2.) We answered the question respecting the lb. in our last number, p. 339.—(3.) When tinctura iodinii is ordered, we think the simple tincture, according to Magendie's formula, should be used.—(4.) Decoction of aloes should be poured clear from the sediment.—(5.) We are not prepared to answer the question.

Z.—Blaine's Veterinary Art, and *Morton's Veterinary Pharmacy.*

MR. EDWARDS.—The magnetic rings may be obtained of Mr. Cox, 128, Holborn Hill. We can give no opinion of their efficacy.

"OMEGA."—(1.) The mode of preparing vin. ferri with tartrate of iron, as recommended by M. Soubeiran, is given vol. iii., p. 544.—(2.) Emulsio amygd. amaræ may be made like mistura amygdalæ, substituting bitter for sweet almonds.

"A LEARNER."—*Lindley's Elements of Botany*, and also his *Introduction.*

"PERSEVERANDO."—See the above. *Fownes's Manual of Chemistry.*

MR. HADFIELD wishes to know the cause of the sediment in tincture of vanilla, which he observes to occur in cold weather.

"PHARMACIEN."—(1.) In preparing a prescription in which quinine is ordered with compound infusion of roses, it would be improper to add more of the acid for the purpose of dissolving the quinine.—(2.) In the following prescription a precipitate is thrown down, should it be separated by filtering?

℞ Potas. carb. ʒij.
Acid. tart. q. s. ad saturationem.
Syrup Croci ℥ss.
Vin. Antim. ʒij.
Aq. cinnam. ad ℥vj. Misce.

[If excess of the acid were added, bitartrate of potash would be thrown down, otherwise the precipitate, if any occurred, might be ascribed to impurities in the carbonate of potash, and ought to be separated. Carbonate of potash of the present Pharmacopœia is the subcarbonate of the former one.]

A. P. B.—We have never seen either the seeds or cormi (erroneously called bulbs) of colchicum, used in the form of *infusion;* and are unacquainted with any formula for such a preparation. The dose would of course depend on the proportions of the ingredients employed. If our Correspondent made an infusion containing the same proportions of seeds or cormi to those of the officinal *vinum, tinctura*, or *acetum*, the dose would be the same. If less of the active ingredient be employed, the dose must be increased proportionately. We are unacquainted with *Bouche's Rheumatic Mixture.*

"A MEMBER."—Sodæ potassio-tart. ought not to be kept for any length of time in a brown paper parcel. When it has become discoloured by this means, it would require solution and recrystallization to restore it to its former purity.—(2.) We think syrup with crumb of bread would be a good excipient for making iodide of iron into pills.

Mr. Thompson,—(1.) Apprentices subscribing to the PHARMACEUTICAL SOCIETY receive the Journal gratis.—(2.) ALMOND PASTE: ℞ Amygd. dulc. et amar. āā ʒij—Cetacei ʒij—Ol. amygd. ℥ss—Saponis (Windsor) ℥ss—Aquæ Rosæ. ℥j—vel q. s.—Otto Rosæ—Ess. Bergam. āā gutt xij. Misce sec. artem, Honey is sometimes added, and also camphor.

G. N.—*Iberis amara*, or *bitter candy-tuft*, is an indigenous plant belonging to the natural order *Cruciferæ*. Seeds acrid, bitter, and purgative. Herb esteemed antiscorbutic, like common cresses. The plant has been employed as a lithontriptic, and as a remedy for sciatica.

"QUERCUS."—See vol. iii., p. 352.

H. B. M.—We are obliged by the receipt of the suggestions.

"ÆSCULAPIUS" should inquire at the College of Surgeons.

A. P. S. states that the liquid cochineal, made by the formula given in this Journal, does not keep, and inquires whether spirit should be added? [We have not tried the addition of spirit, but presume it would have the desired effect.]

"A SUBSCRIBER, Leamington" (post mark Coventry).—Manufacturers do not all adopt the same process for making chloric ether, which accounts for the difference observed in it, and also for the difference in the price. It is of no use to screw down a manufacturer in the price, as it is easy to reduce the strength to suit the customer.

T. N. S. (Reading).—Mr. Drayton informs us, that he has sold his patent for silvering glass; but the arrangements for bringing it into operation are not quite complete. He is now in Paris, completing arrangements for the introduction of the process into France.

O. A. We do not know what Dr. Milliner's Red Cough Drops are composed of.

"A QUERENT."—*Ferri Carbonas Saccharatum, E. P.*: ℞ Sulphate of Iron ℥iv—Carbonate of Soda ℥v—Pure Sugar ℥ij—Water Oiv. Dissolve the two first, each in Oij of the water, add the solutions, and mix them; collect the precipitate on a cloth filter, and immediately wash it with cold water, squeeze out as much of the water as possible, and without delay triturate the pulp which remains with the sugar previously in fine powder. Dry the mixture at a temperature not much above 120°.

For *Liquor Ferri Oxysulphatis or Persulphatis*, see *Pharmaceutical Journal*, vol. i., page 598.

"A SUBSCRIBER."—Vegetable oils are deprived of colour by the action of solar light, by animal charcoal, and by other methods. Strong acids are sometimes used for the same purpose.

J. G.—(1.) The occurrence of a white precipitate when oil of vitriol is diluted with water, and of a black precipitate when sulphuretted hydrogen is passed through the diluted acid, indicate the presence of lead. Arsenic may be detected by Marsh's or Reinsch's process, and nitrous acid by a concentrated solution of protosulphate of iron, as described by our Correspondent. Any salt added for the purpose of increasing the specific gravity, as for instance sulphate of potash, may be detected by evaporation to dryness.—(2.) Litmus or turmeric paper.

"A MEMBER."—Anonymous letters cannot be officially noticed or received by the Council.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to THE EDITOR, 338, Oxford Street, before the 20th of the month.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. IX.—MARCH 1st, 1845.

DIVISION OF LABOUR IN THE MEDICAL PROFESSION.

Experience has shown that the nearest approach to perfection in any profession or business is attainable by the concentration of individual talent and industry in each of the several departments which it comprises. This kind of classification did not exist in the medical profession until the advancement of knowledge had so much extended the field of its usefulness, that it became impossible for any individual to arrive at proficiency in every department. But the division of labour thus introduced was not calculated of necessity to destroy the unity of the profession as a whole: it is still one profession, and while each class comprised in it has special functions to perform, there is a general qualification and community of interest in which all who are within the pale must participate. All are equally concerned in the promotion of education in its several branches, and in the protection and welfare of the entire body.

It is to be regretted that the harmony of the profession has been disturbed by party contentions, and that a rivalry between the several classes has existed; but this should be attributed not so much to the division of labour, as to the imperfect manner in which this principle has been carried out. For the public benefit, laws were introduced to regulate the standard of education among medical men, and to restrain unqualified persons from doing mischief, and the profession having divided itself into three distinct classes, Physicians, Surgeons, and Apothecaries (or Pharmaceu-

tists), these several bodies were invested with a certain control over their respective members, and also with means of defence against ignorant pretenders to medical skill.

But the Apothecaries having become general practitioners, the division of labour in their case no longer exists; and the Chemists who have succeeded them as representatives of Pharmacy, are not yet legally installed into their proper position, although they are recognised by Royal Charter and public opinion. There are still, as there have been for many years, three divisions in the medical profession; and the fact that Pharmacy has changed hands does not alter its position in reference to the other branches. Medical legislation cannot be complete unless it includes Pharmacy, and sooner or later the three estates must be placed on a similar footing.

We presume that this department was omitted by Sir James Graham in his Medical Bill, in order to cut off one source of opposition, and thus to diminish the difficulty of carrying a measure which, even in its present state, is sufficiently complicated. In fact, we have heard it remarked by those who have been engaged in Medical Reform, that whenever any bill is introduced which affects the Chemists, a violent opposition is inevitable. This being the prevailing impression, founded upon past experience, it was probably the most judicious course to divide the question into two parts, and settle the affairs of the other branches of the profession in the first instance.

But we contend that the case is very much altered within the last five years, and we attribute the opposition of the Chemists in former instances, not to a disposition on their part to resist legislation, but to the unjust and oppressive nature of the laws which were proposed for their control.

The Chemists, like many other men, can be more easily led than driven: and while they naturally assert their rights, and claim independence from extraneous subjection, they are not so blind to their own interest, or so indifferent to their credit and character, as to be averse to legislation altogether. On the con-

trary, it has for many years been a source of complaint among them, as we have frequently had occasion to observe, that they have not held that position, as an educated body and an integral part of the profession, which they ought to occupy, and which can only be secured to them by Act of Parliament.

At the time that those Bills to which the Chemists objected were brought into the house, no incorporation of their body existed, nor was there even an Association to which application could be made for the purpose of ascertaining their sentiments, or obtaining their co-operation. Consequently the Society of Apothecaries was selected as the body which should preside over Pharmacy, and regulate the examination and other affairs of the Chemists. The Chemists felt they were entitled to be considered a distinct branch of the profession; and that they might fairly claim the same kind of superintendence and jurisdiction over their own body as the Physicians and Surgeons exercise in their respective departments. But being aware that they were not in a position to support this claim for want of recognition as a body corporate and politic, they united, and established an Association for the purpose of removing the only obstacle to the reform of their department in a manner creditable and satisfactory to themselves.

During more than four years they have been steadfast in their exertions to introduce a proper system of Pharmaceutical education and examination, and if we may judge from the harmony which has prevailed among them during their labours, there is no reason to anticipate any opposition from them to an Act of Parliament confirming and legalizing the reform in which they have made considerable progress.

The difficulty of legislating for the medical profession consists chiefly in the arrangement of the several divisions, and the place to be assigned to each, and this difficulty is increased by the prevailing error of expecting too much from legislation. It is within the province of the law to take cognizance of the education and examination of the members of each section or department, but

the law cannot exercise an absolute control over the public so as to enforce a strict compliance with this division of labour. In proof of this assertion, we need only advert to the fact, that a majority of the profession consists of general practitioners. The separation of Pharmacy from the practice of medicine is desirable, but cannot be universally enforced, and notwithstanding all the endeavours which may be made to keep the three departments distinct, this can only be done to a certain extent, subject to the prejudices and wants of the public, and the circumstances of particular cases.

In each department—Medicine, Surgery, and Pharmacy—there should be a minor and a major qualification. The possession of the minor qualification in each should entitle a person to a licence to practise as a general practitioner, while the door should be open to him to obtain the major qualification or highest rank in any department which he may prefer. At the same time, any practitioner should have the option of coming before the public in the highest rank in any one of the three capacities, without becoming in the first instance a general practitioner. The highest rank in the three departments should be equal. Thus the Chemist could attain as exalted a position in his own sphere as the Chemists of the first class enjoy in Germany and France, and in proportion as his prospect of distinction as a Chemist increased, the temptation to act as an irregular Medical Practitioner would diminish.

All unnecessary obstacles to the transition of practitioners from one sphere to another, should be removed, as such obstacles furnish a pretext for irregular practice. At present, Chemists who wish to become general practitioners, are prohibited from coming up for examination on account of a technical objection relating to their apprenticeship. Pharmacy being the groundwork of education in all departments, those who have attained a qualification in that branch, ought to be able, at their option, either to rise higher in the same, or diverge in another direction—an examination, according to the sphere or rank adopted, being compulsory in all cases.

By this arrangement the principle of *division of labour* would be carried out to as great an extent as circumstances would admit, and the general practitioners, instead of becoming a distinct body, severed from and at variance with the three classes of which the profession consists, would unite the whole and participate in the functions of each. Those who were dissatisfied with their position might rise in whichever direction they felt disposed, ability and merit being the only passports to the highest rank. It is not likely that any person would be disposed to kick down the ladder on which he himself was rising, or to undermine that on which others might rise without interfering with his interest. Consequently, all parties would be interested in maintaining the integrity and dignity of the three estates or divisions, and the followers of each would feel themselves identified with the particular branch which they had chosen, and in which they might individually look forward to distinction.

It is possible that some of our readers may call in question the propriety of our adverting to the arrangements respecting Medicine and Surgery ; but it would be impossible to explain our views with regard to the claims and position of our own body, without taking a cursory survey of the whole profession. In so doing, we are only returning the compliment which has been paid to the Chemists by medical men who have taken up the subject of Medical Reform, and who have not considered it out of their province to include Pharmacy in their programme.

In regard to division of labour, we imagine that Sir James Graham's Bill, with a similar measure to regulate Pharmacy, would place the profession in a position resembling to that which we have described. It may be desirable to impose rather more stringent restrictions on unqualified persons, and probably to make other modifications in the Bill, which was purposely submitted to the Profession for consideration, and should be considered dispassionately and without prejudice, as soon as it is laid before the public in its amended form.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF A LECTURE ON THE DETERMINATION OF SPECIFIC GRAVITIES, AND THE CONSTRUCTION AND APPLICATION OF HYDROMETERS.

Delivered at 17, *Bloomsbury Square, January* 22, 1845,

BY MR. THEOPHILUS REDWOOD,
Lecturer on Practical Pharmacy to the PHARMACEUTICAL SOCIETY of Great Britain.

THE determination of the specific gravity of a body, consists in estimating the weight of a given volume of it, as compared with an equal volume of some other body. The bodies usually taken as the standards of comparison, are, *pure water* for solids and liquids, and *atmospheric air* for gases.

In its practical application for estimating the strength or purity of substances, this process is seldom or never resorted to, by the Pharmaceutist, with reference to gases; and this branch of the subject will therefore be omitted in the present lecture.

1. *The specific gravity of a solid substance, insoluble in water,* is determined by first weighing it in the usual manner, with an accurate balance, suspended in the air, then attaching a horse-hair or fine silken thread to it, immersing it in water, and ascertaining the force with which it tends either to sink to the bottom, or to float to the surface of the liquid. By this means we ascertain the relation which the weight in air of the body to be estimated bears to that of an equal volume of water. The process is founded upon the well-known facts, that a solid body, such as a globe of glass, that is impervious to water, on being immersed in that liquid, displaces a volume of water equal to that of the body so immersed; and that the surrounding liquid exercises a pressure upwards, upon such body, equivalent to the weight of the volume of water displaced.

Thus, a piece of lead is found to weigh 398 grains in air: when immersed in water, its weight is 362.4 grains, and the difference between these two weights, namely, 35.6 grains, is the weight of the volume of water displaced by the lead, or of a volume of water equal to that of the lead. The volume of water being taken as unity, the specific gravity of the lead is found by the following rule of three sum:

35.6 : 1 : : 398 : 11.176, the specific gravity of the lead.

2. In taking the specific gravity of *a solid substance lighter than water*, some modification of the process is required, but we nave, nevertheless, the same preliminary points to determine: first, the weight of the substance in air; and secondly, the weight of an equal volume of water. This may be illustrated by taking the specific gravity of a piece of wax. The weight of the wax in air is 105.4 grains. On immersing the wax in water, two pressures are exerted—a pressure downwards, equal to the gravity or weight of the wax, and a pressure upwards, equal to the weight of the volume of water displaced by the wax; but the specific gravity of water being greater than that of wax, the upward pressure preponderates, and the wax rises to the surface. Thus we find that a volume of water equal to that of the wax, weighs as much as the wax, and something more. We must ascertain how much more, and this is done in the following manner: some body heavier than water, and the weight of which in water is known, is attached to the wax, and the two bodies are weighed in water together. A piece of lead may be used for this purpose. The lead alone weighs 378 grains in water; with the wax attached to it, the weight in water is 372.4 grains, making a difference of 5.6 grains, and this 5.6 grains is equal to the excess of the upward over the downward pressure on the wax when immersed in water. Thus, a volume of water equal to that of the wax weighs 5.6 grains more than the wax, or 105.4 + 5.6 = 111 grains.

Then, 111 : 1 : : 105.4 : 0.949, the specific gravity of the wax.

3. It sometimes happens that the solid substance, the specific gravity of which is to be determined, is *in powder*, or *in several small particles*. In such cases, it is found convenient to proceed as in the following method of taking the specific gravity of calomel.

100 grains of calomel are introduced into a specific gravity bottle which holds 1000 grains of distilled water; the bottle is now filled up with water, and the weight of the contents is found to be 1083.7 grains; deducting the weight of the calomel (100 grains) from this, the remainder (983.7 grains) will be the weight of the water in the bottle, and the difference (16.3 grains) between this and 1000 grains, the weight of the whole contents of the bottle when filled with distilled water, is the weight of a volume of water equal to the volume of the calomel.

Then 16.3 : 1 : : 100 : 6.03, the specific gravity of the calomel.

4. In taking *the specific gravity of substances soluble in water*, other modifications of the process are required. Sometimes the substance may be covered with a thin coating of varnish, so as to protect it from the action of the water. This method answers

very well for blue pill, which may be brushed over with a strong tincture of mastic, and then proceeded with as in the case of the lead. In other instances, however, it is necessary to pursue a different course. Thus, any powder that is soluble in water, must have its specific gravity taken, in the first instance, with reference to some liquid in which it is not soluble. Spirit of wine, oil of turpentine, or olive oil, may be used in such cases. The process may be illustrated by describing the method of taking the specific gravity of guano in oil of turpentine. In the first place the specific gravity of the oil of turpentine is ascertained to be 0.874. Then 100 grains of guano are introduced into a specific gravity bottle, as in the case of the calomel; and the bottle being filled up with oil of turpentine, the weight of the contents is found to be 922.7 grains, from which deducting 100 grains, the remainder (822.7 grains) will represent the oil not displaced by the guano, and this deducted from 874 grains, the quantity of oil the bottle is capable of holding, leaves 51.3 grains as the weight of a volume of oil of turpentine equal to that of the guano. Now, 874 : 51.3 : : 1000 : 58.7, the weight of a volume of water equal to that of the guano.

Then 58.7 : 1 : : 100 : 1.7, the specific gravity of the guano.

In the foregoing processes, the apparent weight of a body when weighed in air has been assumed as its true weight. The true weight of a body, however, is only obtained by weighing it *in vacuo*, and the apparent weight in air is greater or less than this, by the weight of a volume of air equal to the difference between the volume of the body weighed, and that of the weight employed. This correction is never made in ordinary cases.

The methods by which *the specific gravities of liquids* are usually determined, may be divided into two classes:—

1st. Those which consist in filling any suitable vessel with the liquid to be estimated; ascertaining the weight of the contents, and dividing this by the weight of the same volume of water.

2d. Those which consist in displacing a portion of the liquid by some solid body floating in it, and estimating the specific gravity according to the weight and volume of the substance immersed, as compared with its immersion in water.

In the first case, the instruments employed are a *specific gravity bottle* and an ordinary *balance*.

In the second case, the instruments used may be comprehended under the general terms of *hydrometers*, or *arëometers*. These, however, are distinguished from each other, for there are many varieties of them, by different names, according to the particular purpose for which they are respectively intended, or from some peculiarity in their construction.

5. *The specific gravity bottle* affords the most accurate means

of determining the comparative densities of liquids. It consists usually of a globular bottle with a flat bottom and a slender neck, which holds exactly 1000 grains of distilled water at a certain fixed temperature. It is very easy at any time to test the accuracy of one of these bottles by a single experiment, and having ascertained that the bottle is correctly adjusted with regard to distilled water, the indications afforded with any other liquid will be equally trustworthy. The weight, in grains, of the quantity of any liquid filling such bottle, will indicate its specific gravity. In the use of the specific gravity bottle there are two points which require particular attention :—The *first* is, that the bottle should be perfectly clean and dry before introducing the liquid to be tried; and the *second* is, that the liquid, when the bottle is filled to the proper mark with it, should be exactly at the temperature at which the original adjustment of the bottle with distilled water was made. It is sometimes found difficult to dry a specific gravity bottle quickly, when required to be used for several successive operations; and also to get it perfectly clean when it has been used for oils. In such cases, the best mode of proceeding is to introduce some clean dry and warm sand, free from dust, and to shake this out; repeating the process until the desired effect is completed. With regard to the temperature at which the specific gravity bottle is to be used, it must be borne in mind that the London Pharmacopœia directs specific gravities to be always taken at 62° Fahr., and therefore every English Pharmaceutist ought to have his specific gravity bottles adjusted at this temperature, at which, also, he should of course use them. The manufacturers of these instruments, unless they receive express instructions to the contrary, usually adjust them at 60° Fahr.

Hydrometers, or *arëometers*, are floating instruments, and their application for the purpose of determining the specific gravities of liquids, depends upon the fact that a body immersed in any liquid sustains a pressure from below upwards, equal to the weight of the volume of liquid displaced by such body.

The use of hydrometers for determining the specific gravities of liquids, has been traced back to a period about 300 years before Christ; an instrument of this kind being described as the invention of Archimedes, the Sicilian mathematician. It subsequently fell into disuse, but was again brought into notice by Basil Valentine.

There are two kinds of hydrometers, which may be taken as types for all the different varieties in regard to construction :

1st. Those which are always immersed into the liquids to be tried, to the same depth, and to which weights are added to adjust the instrument to the density of any particular liquid. Of

this description are Fahrenheit's, Nicholson's, and Guyton de Morveau's hydrometers. These instruments indicate the weight of a given volume of any liquid.

2d. Those which are always used with the same weight, but which sink into the liquids to be tried, to different depths, according to the densities of the liquids. These usually have graduated scales attached to their stems. Of this description are the common glass hydrometers generally, including those of Baumé, Cartier, Gay Lussac, Twaddle, Zanetti, &c., and the specific gravity beads. These instruments indicate the volume of a given weight of any liquid.

Sikes's and Dicas's hydrometers combine some of the principles of both types, having moveable weights and graduated scales.

Hydrometers may also be divided into two classes, as follows:

First, Those having a general application for determining the comparative densities of any liquids.

Second, Those intended for special application, as for estimating the comparative strengths of spirits, or the comparative densities of syrups, oils, &c.

Fahrenheit's, Nicholson's, Guyton de Morveau's, and the common glass hydrometers, including Baumé's, Cartier's, Twaddle's, Zanetti's, and the specific gravity beads, belong to the first class.

Gay Lussac's, Sikes's, and Dicas's hydrometers, the saccharometer, urinometer, elaëometer, and galactometer, belong to the second class.

6. *Fahrenheit's Hydrometer* consists of two glass bulbs blown on a tube, like a common hydrometer, excepting that the upper bulb is larger, and the stem is terminated at the top in the form of a cup or funnel. The lower bulb is loaded with mercury, but not so as to cause the entire immersion of the instrument, when put into water, without the addition of weights to the cup at the top of the stem. There is a mark about the middle of the stem, which is the point at which the hydrometer is made to float, by putting the requisite weights into the cup.

7. *Nicholson's Hydrometer* is a modification of Fahrenheit's. It is made of brass, and consists of a hollow globe, to which a very slender stem, surmounted by a cup, is attached; on the opposite side of the globe there is another cup, fixed in a kind of stirrup and loaded, so that this shall always be the lowest point of the instrument when immersed in any liquid. The form of this instrument therefore differs from that of Fahrenheit's in the lower bulb of the latter being replaced by the loaded cup. There is a mark on the stem indicating the point at which the hydrometer is to be made to float by the proper adjustmen of

the weights. The weight of the loaded instrument, when sunk to the proper point, is the weight of the volume of liquid displaced by it. It gives, therefore, the relative weights of equal volumes of the liquids into which it is introduced. This instrument is also sometimes called the *Gravimeter;* it is usually made to displace 3000 or 4000 grains of water, and is sensible to the tenth of a grain in this quantity.

This instrument is applicable, also, for taking the specific gravities of solid substances. By placing the solid body in the cup at the top of the stem, and then adjusting the additional weights required to sink the hydrometer, the weight of such solid body in air is ascertained; then, by placing the solid body in the lower cup, immersed in the water, and again adjusting the weights as before, the weight of the body in water is ascertained; and from these the specific gravity is calculated, as in the other cases described.

Baumé's Hydrometers are used extensively in this country as well as in France, and are applicable for all kinds of liquids. There are two distinct instruments, one for liquids lighter than water, and the other for liquids heavier than water. The latter is, for distinction, called the *Acidometer* or *Saccharometer* (*pèse-acide* or *pèse-sirop*); the former, the *Spirit Hydrometer* (*pèse-esprit*).

8. *Baumé's Acidometer* is made in the form of the common hydrometers. It consists of a glass tube terminated at the lower end by two bulbs, the lowest bulb being much smaller than the other, and intended to contain the ballast with which the instrument is loaded. The scale is marked on a slip of paper, or of ivory, fixed in the tube, and is adjusted in the following manner:—The top of the tube being open, the slip of paper on which the scale is to be marked is put into the stem, and the instrument is then immersed in pure distilled water; quicksilver is now dropped into the lower ball until the instrument sinks so low in the water that only the top of the stem remains above the surface, and a mark is made on the glass denoting exactly the point to which it sinks. The instrument is now taken out of the pure water, and put into a solution of fifteen parts of common salt in eighty-five parts of distilled water, this solution being at the same temperature as the water in which the instrument was previously immersed. The point to which it sinks in this solution is to be marked on the stem as before, and the distance between the two marks being taken with a pair of compasses, and transferred to the slip of paper, the first is made the zero or 0, and the other the 15th degree of the scale. This distance being divided into fifteen equal parts or divisions, each division is called a degree, and the scale is completed by adding as many

more degrees as the length of the stem will admit of. This being done, the slip of paper is again introduced into its place, and so fixed that the zero (0) of the scale shall be exactly opposite the first mark made on the glass. The end of the stem is now sealed with the flame of a blow-pipe.

9. *Baumé's Spirit Hydrometer* is similar in form to the acidometer, but the weight of the instrument, and the scale, are different. In this case, the hydrometer is first immersed in a solution of ten parts of common salt in ninety parts of water; but it is made to float, so that the greater part of the stem shall be above the surface of the water. This point is marked, and the instrument is then transferred to pure distilled water, when another mark is made. The distance between these marks is made ten degrees of the scale, which are divided with the compasses, and marked on the slip of paper, as in the other case, the floating-point in the solution of salt being made the zero, and the degrees carried upwards from this point.

The temperature at which these instruments were originally adjusted by Baumé, was 10° Reaumur, or 12.5 Centigrade; but those made in England are usually adjusted at 60° Fahrenheit. It is sometimes important to be aware of this difference, and to bear in mind that in the London Pharmacopœia specific gravities are directed to be taken at 62°.

10. *Cartier's Hydrometer* is much used in France. It is only applicable for liquids lighter than water. This instrument is a modification of Baumé's spirit hydrometer, the form of the instrument being the same, and the same point being taken as the zero of the scale; but the space which in Baumé's scale is divided into 32°, is in Cartier's divided into 30°.

It is becoming the common practice in this country to have the scales of hydrometers marked with the specific gravities intended to be indicated, and this is by far the most convenient kind of hydrometer for general use.

11. *Twaddle's Hydrometers* are much used in Scotland, and occasionally in England. They are made of glass like the common hydrometers, and are sold in sets of six. Each degree on the scale is equal to 0.005 of specific gravity, so that the specific gravity of a liquid is found with these hydrometers, by multiplying the number of degrees indicated by 5, and adding 1000. Thus, 10° by Twaddle's hydrometer, $\times 5 + 1000 = 1.050$ specific gravity.

12. *Zanetti's Hydrometers*, which are made at Manchester, are also sold in sets of six. With these the specific gravity is got by adding a cypher to the number of degrees indicated.

13. *Specific gravity beads*, sometimes called *Lovi's beads*, are hollow sealed globes of glass, about the size of small pistol-

bullets. Each bead is a small hydrometer, intended to indicate one fixed density, by its remaining half-way between the top and bottom of the liquid into which it is introduced. These beads are sold in sets, each one being marked with the specific gravity it is to indicate at a certain fixed temperature. They are very useful in making mixtures of any required densities, as, for instance, in making test acids.

14. *Gay Lussac's Alco-ometer* is frequently employed in France; it is adapted only for estimating the strength of spirits. The instrument is made like a common glass hydrometer, the scale of which is divided into 100 parts or degrees. The lowest division, marked 0, at the bottom of the scale, denotes the specific gravity of pure water at a temperature of 15° cent., and the highest division, at the top of the scale, the specific gravity of absolute alcohol at the same temperature. The intermediate degrees indicate the number of volumes of absolute alcohol in 100 volumes of the spirit tried. The instrument is accompanied by a table for correcting the numbers marked on the scale, when it is used at any other temperature than that of 15° cent.

15. *Sikes's Hydrometer* is used exclusively in the collection of our spirit revenue. It consists of a spherical ball or float, and an upper and a lower stem made of brass; the upper stem has ten principal divisions, numbered 1, 2, 3, &c., which are each subdivided into five parts; the lower stem is made conical, and has a pear-shaped loaded bulb at its lower extremity. There are nine moveable weights having the form of circular discs, and numbered 10, 20, 30, and so on to 90. Each of the circular weights is cut into its centre, so that it can be placed on the inferior conical stem, and slid down to the bulb; but in consequence of the enlargement of the cone, they cannot slip off at the bottom, but must be drawn up to the thin part for this purpose. The instrument is adjusted to strong spirit, specific gravity .825 at 60° Fahr., this being reckoned as standard alcohol. In this spirit the instrument floats at the first division, 0, or zero, without a weight. In weaker spirit, having a greater density, the hydrometer will not sink so low, and if the density be much greater, it will be necessary to add one of the weights to cause the entire immersion of the bulb of the instrument. Each weight represents so many principal divisions of the stem as its number indicates; thus the heaviest weight, marked 90, is equivalent to ninety divisions of the stem, and the instrument with this weight added, floats at 0 in distilled water. As each principal division on the stem is divided into five, the instrument has a range of 500 degrees between *standard alcohol*, specific gravity .825, and water.

In using this instrument, it is immersed in the spirit, and

pressed down by the hand to 0, till the whole divided part of the stem be wet. The force of the hand required to sink it will be a guide in selecting the proper weight. Having taken one of the circular weights, which is necessary for this purpose, it is slipped on the conical stem. The instrument is again immersed and pressed down as before to 0, and is then allowed to rise and settle at any point of the scale. The eye is then brought to the level of the surface of the spirit, and the part of the stem cut by the surface, *as seen from below*, is marked. The number thus indicated by the stem is added to the number of the weight employed, and with this sum at the side, and the temperature of the spirits at the top, the strength *per cent.* is found in a table which accompanies the hydrometer. The strength is expressed in numbers denoting the excess or deficiency *per cent.* of proof spirit in any sample, and the number itself, having its decimal point removed two places to the left, becomes a factor, whereby the gauged contents of a cask or vessel of such spirit being multiplied, and the product being added to the gauged contents if over proof, or deducted from it if under proof, the result will be the actual quantity of proof spirit contained in such cask or vessel.

16. *Dicas's Hydrometer* is similar in construction to Sikes's, and it is used in a similar manner, with the same result, indicating the relation of the spirit tried to standard proof spirit.

It is the practice in commerce to designate the strength of spirit as so many degrees above or below proof, the government having fixed upon what is called *proof spirit* as the standard in comparison with which the strength of all spirit shall be estimated. The term *proof* is said to have been derived from the ancient practice of trying the strength of spirit by pouring it over gunpowder in a cup, and then setting fire to the spirit; if, when the spirit had burned away, the gunpowder exploded, the spirit was said to be *over proof;* if, on the other hand, the gunpowder failed to ignite, in consequence of the water left from the spirit, it was said to be *under proof.* The weakest spirit capable of firing gunpowder in this way was called *proof spirit;* but it requires a spirit nearly of the strength of what is now called rectified spirit to stand this test. The *standard proof spirit* of the excise is defined by law (56 Geo. III., cap. 140) to be "*that which at a temperature of* 51°, *by Fahrenheit's thermometer, weighs exactly twelve-thirteenth parts of an equal measure of distilled water.*" This will have a specific gravity of .923 at 51° Fahr., or about .920° at 60° Fahr. The *standard alcohol* of the excise is spirit, the specific gravity of which is .825 at 60° Fahr. By "spirit 60 degrees over proof" is understood a spirit, 100 measures of which, added to 60 measures of water, will form

standard proof spirit, sp. gr. .920. By "spirit 10 degrees under proof" is understood a spirit, 100 measures of which, mixed with 10 measures of standard alcohol, sp. gr. .825, will form *standard proof spirit*.

17. *Saccharometers*, which are hydrometers intended for determining the density of syrups, are usually made and graduated in the same manner as Baumé's Acidometers, and differ only from these in being made smaller; but the scale is sometimes graduated to indicate the proportion of sugar in the solution.

18. The *Urinometer* is a small hydrometer, originally suggested by Dr. Prout for estimating the density of urine. The scale is divided into 60 degrees, the zero being the point at which it floats in distilled water. The numbers on the scale, added to 1000, the assumed specific gravity of water, give the specific gravities at the respective points. Thus, supposing the number cut by the surface of the fluid to be 30, this indicates a specific gravity 1030. The letters, H. S., on the back of the scale, signify *healthy standard*, which ranges from 10° to 20° of the scale. The space from 30° to 60° is marked *diabetes*.

19. *The Elaëometer* of M. Gobley, of Paris, is a very delicate glass hydrometer, intended for testing the purity of olive oil or oil of almonds, by determining their densities. The 0 or zero of the scale, is the point at which the instrument floats in *oil of poppy seeds*. The point at which it floats in *pure olive oil*, is made the 50th degree, and the space between these two points is divided into 50 equal parts and numbered accordingly. It floats at 38° or 38½° in *pure oil of almonds*.

20. *The Galactometer* is similar in construction to the Elaëometer, but is intended for determining the quality of milk. There are two scales which have been attached to the Galactometers; one indicates the different qualities of cow's-milk, according to its density; the other is intended to distinguish the milk of one animal from that of another animal. These instruments were originally suggested by Cadet de Vaux, and subsequently improved by Dinocourt, 7 Quai St. Michel, Paris, by whom they are made.

21. There are other means besides those above described for taking the specific gravities of liquids. Thus on weighing a solid body, first in air and then in water (as described in process 1.), the weight of a volume of water equal to the volume of the solid substance employed, is ascertained; and if this be repeated, using the same solid body, but immersing it in any other liquid besides water, the weight of an equal volume of such other liquid is determined; then the latter result divided by the former, will give the specific gravity of the second liquid employed. This method is well adapted for taking the specific gravity of any

liquid, where only a small specimen of it is available for the purpose. A small piece of glass, or of platinum, suspended by a hair, may be used as the solid body in such cases. A bit of platinum, of the size of a swan-shot, and half a drachm of liquid, contained in a small test tube, will afford an accurate result with a good balance.

22. The principle of the syphon has been applied in the construction of an apparatus for determining the specific gravities of liquids. Two glass tubes of equal length, are connected by means of a short brass tube, bent twice at right angles, so as to form a syphon. In the space between the two limbs of the syphon is placed a scale divided into 1000 or any number of degrees. A stop-cock is fixed in the brass connecting-piece at the top of the syphon, by which the air can be exhausted, and any liquids into which the lower extremities of the tubes are immersed, made to ascend in the tubes. If one limb of the syphon be immersed in distilled water, and the other in any liquid the specific gravity of which is to be determined, contained in two glasses; and if the air be exhausted with the mouth or with a syringe, so that the liquids, or at least one of them, shall rise nearly to the top of the syphon, the length of the columns thus sustained by the pressure of the external atmosphere, will be in inverse proportion to the specific gravities of the liquids. Then, water being taken as unity, the specific gravity of any other liquid in relation to it is easily ascertained. Thus, if water stands at 240° in one limb of the syphon, and oil of vitriol at 131° in the other, we ascertain the specific gravity of the oil of vitriol by the inverse rule of proportion, as follows :—

131 : 1 : : 240 : 1.845, the specific gravity of the oil of vitriol.

A description and drawing of this apparatus were communicated to the *Chemical Gazette* last year, by Mr. Ham, as a recent invention of his. In the succeeding number of that journal, a claim for priority of invention was made by Sir James Murray, who states that he had exhibited and described the same instrument, a few months before, at a meeting of the Dublin College of Physicians. The fact is, however, that this instrument has been used by scientific Chemists for more than twenty years, and a drawing and description of it were published many years ago, in one of the scientific journals of the day.

PHARMACEUTICAL MEETING,

FEBRUARY 12th, 1845,

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

ON SOME NEW COMBINATIONS OF IODINE.

BY A. T. THOMSON, M.D., F.L.S., &c.

Iodine, it is well known, has an extensive range of affinity; but, hitherto, as far as my information extends, its compounds have consisted of its combination with simple substances: thus it combines readily with metals, but manifests little disposition to combine with their oxides, although it forms compounds with oxygen. It also unites with hydrogen, carbon, chlorine, sulphur, phosphorus, and nitrogen; but I am not aware of any attempts having been made to combine it with organized matters, except some that have been lately made by my assistant Mr. Blackwell. The nature and extent of his inquiries, I have every reason to believe, will be laid before the Society, when they are more matured; my object, at present, is to direct the attention of its Members to two iodides, prepared by myself, and to show them three of the extensive group prepared by Mr. Blackwell.

The two iodides which I have prepared, are those of quina and cinchonia, both of which are likely to form valuable additions to the Materia Medica, inasmuch as they contain in themselves the combined properties of a most efficient tonic, and one of the most valuable deobstruents which we possess. One of the great objections to the administration of iodine and iodide of potassium, is the production of that derangement of the system which is denominated *iodism*, and which has occasionally terminated in death. Now this is likely to be prevented by the tonic influence of the quina or the cinchonia. It is true that we already possess such a combination in iodide of iron, but in many instances, where the influence of such conjoint powers are required, preparations of iron cannot be borne. But my object in bringing these preparations before the Society, is not in reference to their medicinal properties, but to induce such of its Members as have more time and opportunity than I can command, to examine their nature and determine their chemical characters.

The *Iodide of Quina* is prepared by triturating together, in a mortar, 164.55 grains of pure quina, and 126.3 grains of iodine; the latter being added to the former until the whole is intimately mixed; and then boiling the mixture in a moderate quantity of distilled water at first; adding more by degrees, until as much is added as will give one grain of the iodide for each fluid drachm of the solution. During the boiling a deep

brown resinous-like substance is formed, apparently insoluble in water, which subsides to the bottom, when the solution cools. This substance is brittle, tasteless, inodorous, and affords no indication of the presence of either iodine or quina: it is partially soluble in boiling alcohol. I have not been able to ascertain its nature.

The iodide of quina, in solution, is of a pale straw colour, limpid, evolving a faint odour of iodine, and impressing upon the palate the bitter of quina: that it contains no free iodine is evinced by testing it with starch, whilst the existence of the iodine is immediately demonstrated by the development of the deep indigo blue colour of the iodide of amidine, on adding a drop of nitric acid to the solution containing the starch. The quina in the solution of the iodide is precipitated by infusion of galls, in the form of a tannate; and, in its simple state, when the solution of pure potassa is added to the solution. It is upon these grounds, namely, the existence of both iodine and quina in this compound, that I have been induced to name it—*Iodide of Quina;* but the real nature of the salt contained in the solution has yet to be determined; and it is the hope of getting this point settled, by those who possess the ability to examine it, and can command more time than is at my disposal, that has induced me to bring it before the Society.

The *Iodide of Cinchonia* is prepared in the same manner as iodide of quina, taking 156.55 grains of the alkaloid, instead of 164.55. The quantity of brown resinous-like matter is less than in the preparation of the iodide of quina: but it closely resembles it in its physical characters, its insolubility in water, and its solubility in alcohol. The solution is nearly inodorous, has the bitter taste of the cinchonia; and a rather deeper straw colour than the solution of iodide of quina. It is limpid, and answers to the same tests as the iodide of quina.

I have not yet crystallized either of these salts, but I shall do so, and pursue my investigations both respecting their chemical characters and their medicinal influence, and lay the results before the Society as soon as my time will permit me.

The three other iodides made by Mr. Blackwell, are those of *fibrin*, *albumen*, and *gelatin*. I will not anticipate his own account of them, and of many other compounds of iodine and organic bases which he has formed, but merely exhibit them, and demonstrate by reagents the presence of both the components in each of them. All of them are limpid, inodorous, and tasteless, and in my opinion, are likely to prove admirable means of conveying iodine into the system. I have prescribed the iodide of albumen in one case of azema; and, were it proper to draw an inference respecting its remedial value from a solitary case, I

should say, with decided success. The nature of these compounds offer new matter of investigation to the Chemist, and most probably many of them may display more valuable therapeutical powers than any of the preparations of iodine already in use.

12*th of February*, 1845.

REMARKS ON PROFESSOR DONOVAN'S PAPER ON A NEW AND MORE EFFICIENT PREPARATION OF CINCHONA BARK.

BY MR. THOMAS JACKSON.

In the October number of the *Pharmaceutical Journal*, p. 155, appears an article on the above preparation, in which are given the particulars for its manipulation, together with calculations of its comparative strength. Having found these very erroneous, I have endeavoured to correct them, with the addition of some illustrations of its theory as applied to practice.

I would first remark, the numerical error in the proposition laid down by the writer for the estimation of the amount of dikinate of quina, obtained in the first part of his process. It is quoted from page 164; he says,

"Its quantity may be determined as follows :—If one French pound (7559 troy grains) of yellow bark furnish on an average 200 troy grains of disulphate of quinina, containing 170 grains of anhydrous quinina, this last, while existing in the bark as dikinate of quinina, must have been in combination with 87.4 of kinic acid, the amount of dikinate of quinina in each French pound of yellow bark, being thus 157.4 troy grains, or eighty grains in eight troy ounces."

Now, 170+87.4=257.4 and not 157.4. This mistake running through the whole of his subsequent calculations and comparisons, seriously misrepresents the strength of the preparation.

Thus, 1st, eight troy ounces (3840 grains) of such bark contain 130.75, and not 80 grains as stated.

2d. The pint of bark liquor containing the whole dikinate of quina of such eight ounces of bark, having added to it 433.51 grains of dikinate of quina (the amount produced by the decomposition of 268.8 grains of native kinate of lime by 315.31 grains of dikinate of quina) will contain 564.26 of dikinate of quina, and not 513.51 grains as stated.

3d. This pint of liquor being made into a syrup of 32 fluid-ounces, each ounce will contain 17.63, and not 16 grains.

4th. A decoction containing the whole dikinate of quina, from two ounces of such bark in 32 ounces of water, will contain 32.68, and not 20 grains.

5th. The comparative strength of such syrup over such decoction will be 17.26, and not 25 times.

6th. One fluid-drachm of such syrup will contain 2.2 grains of dikinate of quina, and be equal to two ounces and one-sixth of such decoction, and not three ounces and six drachms.

7th. One fluid-drachm of such syrup will be equal to 64.62, and not 96 grains of such bark.

I would next remark, the proposition itself on which these calculations are based, amounts to this, that 1000 parts of yellow bark contain on an average 22.49 of quina. Now, the following extract from Dr. Christison would make it appear that not only is the average quoted extreme, but that any attempt so to estimate the alkaloid must be very fallacious. He says,

"The quality, however, even of well chosen samples does seem to differ much, so far as concerns the proportion of alkaloids. An English manufacturer informs me that 100 pounds avoirdupois of good yellow bark yield him sometimes 50, and sometimes only 25 ounces of sulphate of quina; that is, from 31.25 to 15.6 parts in one thousand, or from 23.4 to 11.7 of quina."—*Dispensatory*, p. 330.

Thus whilst the practical Chemist, operating upon good samples under the most favourable circumstances, obtains in some cases but 11.7 parts from 1000, and whose average produce is but 17.55 parts, the writer supposes 22.49 parts to be uniformly obtained without selecting a bark the proportion of whose alkaloid having been estimated, is found sufficient.

With respect to the kinate of lime, which is so important a salt in the preparation of this syrup, the writer simply states, that yellow bark ought to contain seven per cent., and gives the calculated quantities of oxalic acid, &c. for the decomposition of such amount. Referring again to Dr. Christison, we quote the following:—

"The strength and purity of one species, the yellow bark of commerce, may be estimated with some exactness by the amount of calcareous precipitate caused by sulphate of soda or oxalate of ammonia, because it is held that the proportion of quina in this species corresponds with its proportion of cinchonate of lime."—*Dispensatory*, p. 334.

If then so intimate a relation exists between the kinate of lime and quina, the quina varying from 11.7 to 23.4 to 1000, so also must the kinate of lime. Thus, if from a bark containing 22.49 parts of quina to 1000, the kinate of lime be 70 parts, that from a specimen containing 11.7 of quina to 1000, the kinate of lime will be 36.41 parts. Supposing, then, a preparation from the former bark to contain the corrected amounts of the formula, that from the latter containing only half the amount of native kinate of quina, and therefore of kinate of lime, could be concentrated but to one-half that extent.

The following statement of the writer seems practically to

illustrate the truth of these remarks, for whilst his data, correctly reckoned, give 17.63 grains of dikinate of quina to each fluid-ounce of syrup, the strength of that actually prepared shows that it contained but about 10 grains to each fluid-ounce. He says, on comparing the syrup with a decoction,

"The syrup is twenty-five times stronger than the decoction, but as the whole active matter is not extracted, the syrup is still stronger. I found by taste that the syrup is about thirty times more bitter."—*Pharmaceutical Journal*, p. 165.

Now quoting from the writer's paper, we have as follows:—

"M. Guérette and others have shown, that yellow bark, after it has apparently yielded every soluble ingredient to water, retains more than two-thirds of its alkaloid."—*Pharmaceutical Journal*, p. 163.

If then a decoction of thirty-two fluid-ounces be prepared from two troy ounces of bark, the whole of whose dikinate of quina is 32.68 grains, there would not be in solution more than one-third of that amount, or eleven grains; and this syrup being found by taste about thirty times stronger than such decoction, will contain but about 330 grains of dikinate of quina in the same thirty-two ounces measure, or 10.39 grains to each ounce. But 564 grains have been before estimated to be present, of which the equivalent of quina for 433 grains has been actually added, thus leaving a gross deficiency of 234 grains, showing that the bark used was not only deficient of the estimated kinate of quina, but also of the kinate of lime to decompose the added oxalate of quina.

I would again remark, that whilst this preparation is offered as "containing all the virtues of the bark," and as "presenting the active ingredients exactly in their natural state," red cinchonic, a principle closely allied to cinchona tannin in its constitution, and existing, according to Dr. Pereira,* naturally combined with quina in the bark, is altogether absent, being precipitated in course of preparing this syrup.

Further, the active ingredients in solution are not in their natural proportion or state, for whilst the dikinate of quina is increased 4.31 times, the tannin remaining unconcentrated, is

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"It appears from the observations of Henry and Plisson, that cinchonia and quina exist in cinchona bark in combination with kinic acid, and also with red cinchonic."—*Pereira's Mat. Med.*, p. 1397.

"The native compound of red cinchonic and quina is bitter, scarcely soluble in cold water, but more so in boiling water. The liquid becomes turbid as it cools."—*Ibid.*, p. 1398.

"*Red Cinchonic.*—This substance is considered by Berzelius to be a product of tannin altered by the air, and to consist of tannin and apothême. It appears to me to agree in most of its properties with catechine, a substance which is found in great abundance in another genus of cinchonaceous plants."—*Ibid.*, p. 1396.

proportionally diminished. Thus if eight ounces of a syrup contain thirty-four grains of dikinate of quina, and fifty grains of tannin, and there be added to it 112 grains of dikinate of quina, to maintain the relative proportions, there must be added 165 grains of tannin; and for it to contain all the virtues of the bark, there must also be added the red cinchonic, which, when the bark contains seventy parts to 1000, would amount to 301 grains. The merits therefore of this preparation, rest upon its being a solution of dikinate of quina, a salt obtainable by more direct and less costly processes, and which in its crystallized form has been for some time known to the profession.

With respect to the manipulation of the syrup, after the tincture and decoction have been prepared, I would observe, that on distilling the tincture, red cinchonic, combined with quina, precipitates as the spirit evaporates. On mixing the evaporated decoction with the boiling residue, and adding the oxalic acid and quina (components of oxalate of quina), the quina fuses into a mass with the precipitated red cinchonic, materially preventing its combination with the kinic acid. On adding the mixed gum and sugar, the latter is speedily taken up out of the gum, the bulk of which remains undissolved.

The resulting syrup is a thick grey mass, in consequence not only of the diffusion of the undissolved gum, but also of the continued precipitation of the red cinchonic and quina, which, although to some extent in solution in the boiling syrup, is deposited on cooling, and remains suspended in a minutely divided state. The subsequent filtration and separation of the precipitates, which are very bulky, can only be accomplished after large dilution with water. The syrup when reconcentrated, although bright whilst hot, becomes opaque on cooling, even with the addition of one-half more sugar than is ordered in the formula.

I would finally remark, that the principle of concentration by kinate of lime, is comparatively inapplicable to other descriptions of cinchona bark, they containing but a minimum proportion of that salt.

It is also further inapplicable to red bark, on account of its larger per centage of red cinchonic.

Manchester, 30*th Jan.*, 1845.

Dr. Thomson concurred with the author of the paper in thinking, that a more simple process might be adopted for preparing the syrup than that which had been proposed by Mr. Donovan. He also observed the syrup could not be considered to represent all the active constituents of the bark. Some difference of opinion, however, existed as to the efficacy of the red cinchonic.

He had no doubt that it had some medicinal properties, although not so much as had been ascribed to it by some authorities. He considered Mr. Donovan's syrup a valuable preparation in many cases; at the same time there where other cases in which he preferred the decoction.

ON BLUE PILL AND HYDRARGYRUM CUM CRETÂ.

BY J. BIRKBECK NEVINS, M.B. LOND.
Prof. Chem. and Nat. Phil. Coll. Ins. Liverpool.

Dr. Christison appears to have established, by unexceptionable experiments, the presence of a small proportion of oxide of mercury in the mercurial ointment; but an equal degree of care does not seem to have been lately bestowed upon the two above-named preparations. Fifty grains of hydrargyrum cum cretâ of ordinary trade quality were digested without heat for a few hours, in two drachms of hydro-chloric acid, diluted with about three drachms of water. By this means the whole of the chalk was dissolved, and the oxide of mercury, if any was present, was converted into chloride of mercury. After washing, the residue was digested in one drachm of cold nitric acid, diluted with three drachms of water for a few hours, in order to remove the metallic mercury. Effervescence soon commenced, and the black powder disappeared, leaving a small quantity of a heavy white powder. By avoiding the presence of heat, the risk of converting any of the chloride into bichloride of mercury, and so losing a portion in the washing, was avoided. The white residue was then washed and dried, and weighed 0.37 grain. Assuming the whole to be chloride of mercury, it would give 0.74 grain per cent.; but as a small portion of silica is often present in chalk, part of the residue might consist of this material. It was, therefore, exposed for some minutes to the heat of a spirit lamp, until all fumes ceased to be given off, and the remainder, which was not volatile, weighed 0.14 grain. This resisted the action of nitric and hydrochloric acids, but readily fused into a globule, when heated in the blow-pipe flame, with three or four grains of carbonate of potash. The bead thus formed was soluble in water, from which the addition of acetic acid threw down a white gelatinous precipitate. From these characters there can be no doubt that it was silica. In order to prove that the volatile portion was chloride of mercury, a small portion was taken before it was heated, and touched with two or three drops of liquor potassæ, when it became black, and the solution, after subsidence and neutralization with nitric acid, gave a white precipitate with nitrate of silver, which was re-dissolved by a drop or two of solution of ammonia. The loss above stated is the loss upon the whole 0.37 grain, calculated from

that upon the portion to which the heat was actually applied. In fifty grains, then, there was 0.23 grain of chloride of mercury, equal to 0.46 grain per cent. The proportion of oxide present in the original preparation, is easily calculated from these data; for as

Eq. of Hg. Cl.		Eq. of Hg. O.		Quant. of Hg. Cl.		Quant. of Hg. O. per cent.
238	:	210	: :	0.46 gr.	:	0.406 gr.

In 100 grains of this specimen, there was, therefore, less than half a grain of oxide present.

Another specimen was tried, but it did not yield results materially different from these; which confirms Mr. Phillips's remark in his translation of the Pharmacopœia—that he has found that a small portion of mercury is in the state of oxide in hydrargyrum cum cretâ.

The examination of blue pill is attended with much more difficulty, in consequence of the presence of the organic matters contained in the pill. In order to get rid of these, 100 grains were rubbed in a mortar, and afterwards well washed with distilled water. The residue was then digested without heat in a fluid half-ounce of liquor potassæ; and, after washing, the remainder was boiled for an hour in solution of carbonate of potash. By these means a considerable portion of the organic matter was removed. The washed residue was then digested for twenty-four hours in cold hydrochloric acid, diluted as above; and after washing, the residue was treated with diluted nitric acid as above, for a couple of days. What remained after washing was a light flocculent precipitate, which had a brownish tint, as from vegetable colouring matter, but had no appearance of containing any heavy chloride of mercury. As the easiest method for obtaining the mercury from the mixture, it was boiled with solution of potash, to reconvert the chloride into oxide of mercury; and the light coloured matter immediately assumed a black colour. After washing, the black residue was boiled in one drachm of nitric acid, diluted with one drachm of water, to convert it into pernitrate of mercury. The whole was then thrown upon a filter, and washed until it ceased to be acid. A current of sulphuretted hydrogen was passed through the solution, and formed a copious black precipitate. This, when washed and dried, weighed 0.87 gr. It is probable that the whole, or nearly the whole of this, was *bi*-sulphuret of mercury; and the quantity of oxide present in the pill may be calculated as before:—

As Eq. of Hg. S_2.		Eq. of Hg. O.		Quant. of Hg. S_2.		Quant. of Hg. O. per ct.
234	:	210	: :	0.87	:	0.78

In 100 grains of this specimen, there was therefore rather more than three-quarters of a grain of oxide.

I do not, however, find this result to be uniform; for in another specimen obtained from an equally respectable source, the matter

did not become black, on the second boiling in liquor potassæ, but merely became somewhat darkened; and on passing sulphuretted hydrogen through the solution in nitric acid, a scanty olive-coloured precipitate only was formed. This became black on boiling in distilled water, and weighed when dried 0.15 grain. This would give only 0.134 grain, or less than one-seventh of a grain of oxide of mercury per cent. in the pill.

76, *Falkner Street, Liverpool,*
Jan. 22, 1845.

Dr. A. T. Thomson had long been of opinion that the efficacy of the above preparations depended, in a great measure, upon the presence of a portion of oxide, although it appeared from the paper which had just been read, as well as by other experiments, that the quantity was very small. In some cases mercury acted more powerfully in producing ptyalism in very minute doses than in larger. Mr. Donovan had some time ago made these preparations with the oxide, and had stated that they were quite as efficacious as those prepared according to the Pharmacopœia. The same experiment had been tried in this country, but a different opinion had been expressed on the subject. It was difficult to reconcile this apparent contradiction.

Mr. Bell stated, that he had a few years ago made some experiments on this subject, from which he had come to the same conclusion as that expressed in the paper which had just been read; namely, that nearly all the mercury was in the metallic state. If the efficacy depended on the very minute portion of oxide present, it might have been expected that no difference of opinion would exist as to the efficacy of the preparations when made with the metal, as compared to that when the oxide was employed. The existence of a doubt confirmed the opinion which he had formed on the subject. He considered that the question was sufficiently settled for all practical purposes.

SCIENTIFIC COMMITTEE
FOR THE
PROMOTION OF PHARMACOLOGICAL KNOWLEDGE.

This Committee consists of the following Members of the Pharmaceutical Society:

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A. T. Thomson, M.D., F.L.S.

The Committee met on Saturday, the 25th of January, 1845, when sub-committees were appointed for carrying out the several objects contemplated.

T. REDWOOD, *Honorary Secretary.*

ORIGINAL AND EXTRACTED ARTICLES.

TEST FOR NITRIC ACID.

BY J. BIRKBECK NEVINS, M.B. LOND.
Prof. Chem. and Nat. Phil. Coll. Ins. Liverpool.

In the *Pharmaceutical Journal* for March, 1843, a paragraph is copied from Berzelius's *Annual Report*, mentioning that the action of nitric acid upon brucia is a very delicate test for that acid, indicating the presence of $\frac{1}{10000}$th part in any liquid under examination. So many of the delicate tests for nitric acid give similar results with iodic and chloric acids, as to render it not improbable that it might be the case with this also. Accordingly, ten drops of distilled water, containing $m\frac{1}{100}$ of nitric acid were stirred with one drachm of sulphuric acid; to the mixture, a minute portion of brucia, weighing about $\frac{1}{20}$ gr., was added, on the end of a glass rod. In an instant, a delicate red line proceeded from the alkaloid, and gradually extended until the acid surrounding it assumed a beautiful red or pink hue, which gradually changed to yellow, and imparted this colour to the whole acid in a few hours. The same effects were produced by $\frac{1}{24}$ gr. of nitrate of potash, dissolved in three drops of water. The proposer of the test, M. Berthemot, is therefore correct in describing it as possessing singular delicacy. Unfortunately, however, less than the tenth of a grain of iodic acid, treated in the same way with sulphuric acid and brucia, produced appearances exactly similar, and in the same space of time, and a quarter of a grain of chlorate of potash corresponded precisely in its results with the nitrate of potash. This test, therefore, notwithstanding its beauty, and the facility of its application, fails to distinguish nitric acid from iodic and chloric acids. There is, however, one purpose to which it may be conveniently applied. This is to detect the admixture, either accidental or intentional, of nitric acid with acetic acid.

In the notes of the Pharmacopœia, the only direction for finding out the adulteration, is to digest silver leaf in the suspected acetic acid, and then test with hydrochloric acid. If any nitric acid be present, it is supposed that a portion of nitrate of silver will be formed, which will be precipitated as chloride, on the addition of hydrochloric acid. In order to prove this, I added one drop of nitric acid to thirty drops of acetic acid, or rather more than 3 per cent. Silver leaf was digested without heat in this for twenty-four hours, and was afterwards boiled for a few minutes, but no effect was produced on the subsequent addition of hydrochloric acid. Acetic acid does not affect brucia in the way above mentioned, but the adulterated acid produced an immediate and abundant effect. It appears, therefore, that above 3 per cent. of nitric acid may be present in acetic acid, without being detected by the pharmacopœia test, and as the acetic acid contains only 30 per cent. of real acid, it follows that about 10 per cent. of the acid present may be nitric, and still escape detection. Now there is no probability whatever, that iodic or chloric acid will be mixed with acetic acid as an adulteration, and they cannot be present accidentally. This test may therefore be very beneficially introduced for the discovery of nitric acid in this case, and does not appear to be open to any objection.

ON ERVALENTA AND MELASSE DE LA COCHIN-CHINE.

Some years since a person of the name of Warton, in Paris, advertised for sale two substances, under the above title; by the dietetical use of which constipation was said to be prevented, and the use of purgatives and lavements thereby obviated.

Recently he has appointed an agent in London for the sale of his goods; and, with the view of bringing them into notoriety, a shilling pamphlet has been published, under the title of "*Obstinate, inveterate, and habitual Constipation* (*costiveness*), *not only totally overcome, but also completely destroyed* (*without using either Purgatives, Injections, or Baths*), *by a natural, simple, agreeable, and infallible Means, recently discovered in France.*" The means here referred to are Ervalenta and the Mélasse de la Cochinchine.

Not less than a packet of Ervalenta (price 16*s.* 6*d.*), and a bottle of Mélasse de la Cochinchine (price, including the bottle, 11*s.* 6*d.*) are sold; because, as Warton states, "with a smaller quantity the consumer cannot properly judge of the salutary effect which this production is destined to operate." So that if any one of our readers should be desirous of trying Warton's wares, he must pay 28*s.* for the experiment, besides an addi-

tional charge of 1*s.* 10*d.* for packing cases, when the articles are sent by a public conveyance.

In 1843, Warton was tried before the Cour Royale de Paris, for the sale of secret remedies; and Chevallier, one of the professors to the Ecole de Pharmacie, was directed to examine Ervalenta and the Mélasse de la Cochinchine. The former (*Ervalenta*) he found to be the farina or meal of the common lentil (called by botanists *Ervum Lens*), but which Warton sold at three times the price usually charged for it by cornchandlers; and the latter (*Mélasse de la Cochinchine*), was absolutely nothing but common treacle, sold at five times the price charged for it by grocers!

PREVENTION OF ACCIDENTS BY POISON.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

The Chemists and Druggists of this town held a meeting at the Bull Inn, on the 6th instant, to consider what steps could be taken with regard to the sale of poisons. The following resolutions were agreed upon, and have been printed and circulated throughout the town:—

"1. That no Druggist shall sell any poison without putting upon it a printed label, *viz.* "Caution: the contents of this is Poison;" also, the address of the party selling must be upon the label.

"2. That no poison shall be sold to young children.

"3. That each Druggist shall keep a book for the purpose of *registering* the sale of arsenic and other deadly poisons. This book to have ruled columns, properly headed (*in print*), stating the kind of poison sold; the date of such sale; the purpose, or specified purpose, for which it was sold; the signature of the party selling; and, lastly, *the address and signature of the party buying the poison.*"

This plan, which appears excellent, was submitted to the meeting by Mr. J. W. Annington. In addition to the above, I have adopted further precautionary measures. After an experience of twenty-four years (in which I am thankful to Divine Providence I never had an accident) I am of opinion that the principal danger to which a Chemist is exposed, is from *inadvertently* getting hold of a wrong bottle in the hurry and confusion of business. A year or two ago, I placed *a red label* upon each bottle and drawer containing articles usually considered as poisons, with the word "*Toxicum*" written upon each label. But I have recently taken a further step: I have secured

the stopper of each bottle, holding deadly poison, with *a cap of red leather*, firmly fastened by a string, so that should a wrong bottle be taken down *inadvertently*, the party so erring would be called to recollection before a fatal mistake was made. To take off and put on the leathern-cap is not the work of more than a minute or two; and surely this trifling labour is amply compensated by the additional security which it confers.

PETER PHILLIPS.

Burnley, Lancashire, February 15, 1845.

EXAMINATION OF PURREE (INDIAN YELLOW—JAUNE INDIEN).

BY C. L. ERDMANN AND STENHOUSE.*

A superb yellow pigment, adapted for oil or water-colour painting, has for some years been found in the French and English markets, by the names of *Jaune Indien* and *Indian Yellow*. Its origin remained for a long time unknown. It is manufactured in Europe, from a substance brought from India, China, and perhaps also from Africa, and named *Purree*. Erdmann obtained a specimen of this substance marked "*Camel's urine*," which he had received by way of *Havre*, and Professor Jaehkel, of Dresden, recognised this to be the same substance he had formerly brought with him from Paris, as a sample of *Jaune Indien* in the crude state. Stenhouse's attention was first directed by Dr. Pereira to this substance, and the former obtained a quantity through Messrs. Warrington and De la Rue. In France two varieties of *Jaune Indien* are obtained by eleutriation, and sold by the respective names of *Jaune Indien purifié fin à* 5 fr. for 30 grammes, and *Jaune Indien purifié extra fin* at 8½ fr. for 30 grammes. Erdmann made some of his experiments with the more expensive variety. From London I soon obtained a specimen, in the shape of a small ball, ℥ss. in weight, quite corresponding in property with those mentioned below at from 4*s*. to 5*s*. the ounce. The price, however, is subject to variation, as this substance is only met with about once in the year in the market, and then not in a large quantity. I further, on a subsequent occasion, saw a specimen of a substance shown me by Dr. Th. Martius, at Erlangen, which appeared to me to be *purree* made into cake. Martius considered it to be prepared from an Indian species of Berberis†, and referred to a passage in Clarkson's Paper on the Slave Trade, which says, "That in the year 1787, a ship laden with timber brought the bark of a tree from the coast of Africa, yielding a beautiful yellow pigment; the tree whence this bark was derived and the colouring properties of its sap were discovered by chance; but the settler who made the discovery died and the tree was thus lost."

Purree is usually met with in roundish irregularly shaped masses of a dark (or greenish) brown externally, but when broken of a more or less orange-yellow colour, and is composed of acicular crystals; it is very friable, and its

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* Stenhouse's analysis appeared before that of Erdmann; but the latter had completed his investigation in June, and he merely deferred publishing in order to render his work more perfect; nor would it perhaps have appeared now, had not the publication of Stenhouse's analysis rendered this step necessary.—(*The Editor of the Central Blatt.*)

† Stenhouse believes the Purree to be the juice of a plant saturated with magnesia, while Erdmann was unable to offer any direct evidence against the probability of its animal origin. In the east it is generally supposed to be a substance consisting of bezoars from the gall-bladders of some animals, as a deposit from their urine.

odour reminds one strongly of castoreum. It is not very soluble in cold water or in alcohol, but its aqueous solution has a pale yellow colour and is quite neutral. Ether also dissolves a small quantity of it. By boiling it with water we obtain a brown solution, and the residue is of a pure golden colour. This residue is the Indian yellow, distinguished from purree by containing five times the magnesia held in artificial combination with the acid in the latter substance. The water extracts a brown substance, in addition to the small quantity of the yellow salt of magnesia, which on addition of muriatic acid is thrown down as a black pitch-like substance with the development of a very nauseous odour. Alkalies dissolve purree, forming a beautiful yellow solution, without any evolution of ammonia. The purified Indian Yellow, (*Jaune Indien purifié*) is soluble in most acids, effervesces with them, and forms a dark-reddish brown solution; but if the substance was previously boiled with water, the solution is of a yellow colour, and on cooling, the organic acid, which was previously in combination with magnesia in the purree, separates in the form of small yellow acicular crystals arranged in a stellate form. When purree is burned it leaves a quantity of ashes, consisting chiefly of magnesia, a little lime, and carbonate of potash (according to Erdmann, also of some chloride of potassium and magnesium), but they contain no phosphoric acid. The bulk of the purree then consists of salts of magnesia, with a new acid, named by Stenhouse, *purreic*, and by Erdmann, *euxanthinic acid*; we shall follow the nomenclature of the latter chemist.

Euxanthinic acid as obtained by *Stenhouse*:—Dissolve purree cut in small pieces in boiling dilute acetic acid, filter and precipitate with acetate of lead, collect the precipitate, wash it with cold water, and decompose it with sulphuretted hydrogen, then boil the mixture of sulphate of lead and organic matter repeatedly with spirit of wine, and on cooling, the crystals will be deposited. They should now be dissolved in a boiling solution of carbonate of soda, the solution filtered, and again allowed to deposit by neutralizing the fluid with muriatic acid. Wash the crystals with cold water, and dry them by pressure; redissolve them in boiling water, precipitate with lead, and decompose again with sulphuretted hydrogen, and dissolve out by hot spirit of wine the crystals which are to be still further purified by being five or six times crystallized from spirit of wine. Even after this purification, they will still leave a trace of magnesia on being reduced to ashes.

Erdmann's method:—Exhaust the purree with boiling water, dissolve the insoluble residue (or *Jaune Indien purifié*) in dilute muriatic acid with the aid of heat, and allow it to crystallize on cooling; wash the crystals with cold water, and recrystallize from an alcoholic solution. To render the crystals still more pure, dissolve them by gentle heat in a solution of carbonate of ammonia. On cooling the solution slowly, the salt of ammonia will deposit in form of crystals, which are to be washed with carbonate of ammonia, pressed dry, and then allowed to stand, with sulphuric acid, under a glass shade, until the carbonate of ammonia has completely evaporated, when they are to be dissolved in boiling water, and decomposed with muriatic acid. On cooling, the acid will be deposited in a crystalline form, and may be again recrystallized from spirit of wine.

Properties:—The crystals present themselves as pale, yellow, shining needles, first of a mawkish, afterwards of a bitter taste, which, when burned, leave no residue (*if pure*), are soluble in a slight degree in cold water, more soluble in boiling water, and very soluble in boiling spirit and ether. On cooling the hot solutions, the acid crystallizes; from an alcoholic solution, it is precipitated by water, and on heating it in a tube, it melts (giving out its water of crystallization up to a degree of heat = 266° Fahr.) and then yields an acicular sublimate, termed *euxanthenon* or *purrenon*. The acid is soluble in nitric acid, according to Stenhouse, without undergoing decomposition; the solution disengages on application of heat, red vapours and a more soluble

acid is thus obtained, staining the skin or paper of a yellow colour, and yielding with potash a yellow crystalline salt, which detonates on application of heat. The acid is not decomposed by boiling with hyperoxide of manganese alone, but if sulphuric acid be added, it yields *formic acid*. If a solution of the acid be made with pure alcohol, and treated with muriatic acid gas, it forms on cooling, according to *Erdmann*, a granular crystalline yellow substance, insoluble in carbonate of ammonia, and soluble in a solution of potash without spirit, from which it may be again precipitated by muriatic acid, in the form of yellow crystals, having all the properties of *euxanthon*. According to Erdmann, euxanthinic acid is dissolved quickly by concentrated sulphuric acid, and forms a red-brown solution, from which (especially if diluted with water) small crystalline flakes of *euxanthenon* are copiously deposited, which may be purified by washing with water, digesting in carbonate of ammonia, and recrystallizing from spirit of wine. On removal of the sulphuric acid by means of barytes, a yellow substance, containing barytes, which dried in vacuo appears like a resin, will be contained in the fluid whence the euxanthenon was filtered off. Euxanthinic acid is very soluble in caustic alkalies, but crystalline salts are not easily obtained from these yellow solutions; they may however be obtained by dissolving the acid in a solution of the alkaline carbonates (when carbonic acid is disengaged) for the euxanthinic salts are almost insoluble in concentrated solutions of the alkaline carbonates. Euxanthinic salts deposited in this manner may be employed in the preparation of pure euxanthinic acid: this applies more especially to the salt of ammonia, for that of potash is less easily obtained from the mother liquor. Neutral solutions of the acid yield a yellow precipitate with sulphate of magnesia, if ammonia be present, and with almost all the bases. With sulphate of copper, the precipitate is of a green colour. The free acid is not precipitated by lime, barytes, strontian, or the salts of silver, but it is thrown down by acetate of lead.

Composition.—The acid crystallized from spirit, yields, according to Erdmann, at 266° Fahr., 4.35 per cent. of water; but the acid precipitated by muriatic acid from an aqueous solution of the ammoniacal salt, 10.97=11 per cent. Erdmann analysed the acid dried at 266° Fahr.; while Stenhouse's acid was dried at 212° Fahr., hence the difference in their analyses, for the acid cannot be totally deprived of its water at 212° Fahr.

Acid at 212° Fahr. according to Stenhouse:

C.	55.20	...	55.002	...	55.04	...	20 =	1500	...	55.30
H.	4.42	...	4.414	...	4.45	...	9 =	115	...	4.20
O.	40.38	...	40.584	...	40.51	...	11 =	1100	...	40.50
	100.00		100.00		100.00			2712		100.00

Acid at 266° Fahr. according to Erdmann.

C.	56.27	...	56.43	...	40 =	3000	...	56.41
H.	3.09	...	4.06	...	16 =	200	...	3.77
O.	39.74	...	39.51	...	21 =	2100	...	39.82
	100.00		100.00			5300		100.00

The experiments to determine the atomic weight, made by Erdmann with various salts of lead, copper, and silver, varied in result between 5000 and 5500. The analysis of a neutral salt of lead, of a basic salt of magnesia, and of the ammonical salt, gave corresponding results. The salt of lead, analyzed by Erdmann, was precipitated by neutral acetate of lead from a boiling neutral solution of the euxanthinate of ammonia, dried at 228° Fahr. Stenhouse examined a salt of lead dried at 212° Fahr., precipitated by neutral acetate of lead, washed with hot spirit from a boiling alcoholic solution of the acid.

Stenhouse's Salt of Lead.

C.	35.86	...	36.11	...	20 = 1500	...	36.5
H.	2.95	...	3.08	...	9 = 112	...	2.7
O.					11 = 1100	...	26.8
Pb. O.	34.34	...	34.09	...	1 = 1394	...	34.0
					4106		100.0

Erdmann's Salt of Lead.

C.	44.78	...	40 = 3000.0	...	44.81
H.	3.07	...	16 = 200.0	...	2.98
O.	21	=	2100.0		
Pb. O.	20.72	...	1 = 1394.5	...	20.83
			6694.5		100,00

Stenhouse's salt gives an atomic weight for the acid=2662. Erdmann's salt=5337. The former is undoubtedly a double basic salt.

Erdmann makes the following remarks on the salts of *euxanthinic acid*:—

The *ammoniacal salt* consists of small flat shining pale yellow prismatic needles, insoluble in spirit (like the potash salt), and very soluble in water. A solution of it yields yellow precipitates with solutions of most of the metallic salts; the precipitates are soluble in water, but insoluble in the original fluid.

Sulphate of magnesia yields no precipitate with it unless free ammonia be present.

Chlorides of calcium and barium produce yellowish white gelatinous precipitates, which dissolve when the fluid is boiled, but reappear on cooling.

Acetate and nitrate of lead produce flocculent yellow precipitates.

Bichloride of mercury yields no precipitate at first, but a faint yellow deposit takes place after a time.

The sulphates of zinc, nickel, and manganese, produce lemon-coloured precipitates.

The sulphate of the protoxide of iron gives a precipitate which is at first white, but soon becomes greenish brown, and at last black.

The sulphate of the peroxide of iron gives a black green precipitate.

Nitrate of silver forms a yellow gelatinous precipitate, which is dissolved on washing with cold water, and becomes brown by exposure to light.

Sulphate of copper produces, with the euxanthinate of ammonia, a very gelatinous yellow precipitate, insoluble in the solution of sulphate of copper, but tolerably soluble in cold water, so that it cannot be washed without loss.

Euxanthinate of magnesia is a salt of great interest as forming the chief constituent of *purree* and of *Indian yellow;* also an account of a peculiar phenomenon of crystallization observable during its formation. If we add to a solution of chloride of magnesium, muriate of ammonia, until a solution of ammonia ceases to precipitate it, and in mixing this fluid with a solution of euxanthinate of ammonia, add a certain quantity of pure ammonia, or its carbonate, we obtain a voluminous gelatinous yellow precipitate, which appears, when viewed under the microscope, perfectly amorphous; and in this state the precipitate is perfectly soluble when the fluid containing it is boiled. This solubility, however, the yellow precipitate retains but a short time, for in a few minutes it changes its appearance, becomes flocculent, and assumes a deeper, more decidedly orange tinge. If it is now examined with the microscope, the flocculi will be observed to consist of groups of crystals, arranged sometimes in a fan-shaped form, sometimes in globules, which may be divided between two plates of glass into a number of finer or coarser prismatic needles. Erdmann sometimes observed the phenomenon, after mixing rather concentrated solutions in a

test-glass, to take place in the following manner:—The yellow gelatinous precipitate first formed; in a few minutes it became orange-coloured, and so dense that the glass might be turned over without spilling the contents. In the course of a quarter of an hour this gelatinous appearance was lost, and a granular dark yellow powder deposited, which the microscope showed to consist of crystals only, while neither in the first nor second stages a trace of crystallization could be detected. As soon as the precipitate assumes the crystalline form, it ceases to be soluble in water; even if the boiling be continued but very little of it is dissolved. Dilute solutions from which the salt is not immediately precipitated, and the solutions of the amorphous precipitate prepared by boiling, deposit after a time a granular crystalline powder, but slightly soluble in boiling water; in this deposit prismatic crystals may be detected by the microscope quite analogous in appearance to those of the crude *Indian yellow* (*Jaune Indien*). Notwithstanding the crystalline nature of this precipitate, it is not always to be obtained of a corresponding composition. Besides the salt in question, precipitates were obtained with a larger quantity of magnesia, containing 9.75, 9.20, 9.57 per cent. of magnesia. A large quantity of ammonia probably decomposes the preparation by depriving it of a portion of its acid. The basic euxanthinate of ammonia appears to contain a quantity of water. Erdmann obtained 13.05 water=eight atoms, by heating the dry salt to 302° Fahr., at which temperature it is not decomposed. The quantity of impurities mechanically combined with the purree rendered it impossible to determine whether it consists chiefly of the salt described, or a more basic salt. Examined by the microscope no distinction can be made. The *purified Indian yellow* (*Jaune Indien purifié*) contains a far greater quantity of magnesia. Erdmann found forty-six per cent. in a specimen he examined, but a portion of this must have been admixed as carbonate of magnesia. The pure salt has a far more brilliant yellow colour than the finest samples of *Indian yellow* (*Jaune Indien*). Its colour does not appear to suffer in the least by exposure to the light.

Euxanthon.—This neutral substance is obtained, according to Erdmann, not only by heating free euxanthinic acid (especially the salts of lead and barytes) in form a yellow crystalline product of sublimation, but as we before-mentioned, by treating euxanthinic acid with concentrated sulphuric acid, or with alcohol and muriatic acid gas. It forms sometimes a yellow crystal-like powder, sometimes broad pale yellow prisms and flakes. It is soluble in caustic ammonia, forming a yellow solution (but on evaporation it separates as a substance containing no ammonia), also in a solution of potash and in boiling spirit. By applying heat cautiously it may be sublimed without undergoing decomposition. It has no affinity for acids or alkalies. By analysis both Erdmann and Stenhouse obtained corresponding results.

ERDMANN.

	1		2		3*		4†		5‡
C.	68.01	...	68.23	...	68.54	...	68.31	...	68.51
H.	3.60	...	3.57	...	3.58	...	3.65	...	3.68

STENHOUSE.

C.	67.95	...	67.92	...	68.20	...	13 = 975	...	68.42
H.	3.59	...	3.62	...	3.73	...	4 = 50	...	3.51
O.	.....		.....		.....		4 = 400	...	27.96
							1425		100.00

The mode of formation of euxanthon is not very clear, for its formula cannot be explained by assuming a loss of carbonic acid and water.—*Pharmaceutisches Central-Blatt*, Nov., 1844. No. 52.

* † Nos. 3 and 4 of Erdmann's analysis were performed with euxanthon obtained by muriatic acid and alcohol.

‡ In No. 5, the euxanthon was formed by means of sulphuric acid.

ON CLOVE-ROOT.

(RADIX CARYOPHYLLATÆ SEU RADIX GEI URBANI).

BY A. BUCHNER, SENIOR.

Trommsdorff detected in this root a *volatile oil*, *tannin*, a *brown extractive matter* and *resin*; Melandri and Moretti found also *gallic acid*, and Buchner succeeded (by employing caustic lime and then extracting with water) in obtaining a *bitter extractive* of geum—(*Extractum gei urbani*).

An *ethereal extract* of the root is soft, oily, and of a greenish yellow colour; it contains *tannin*, *extractum gei*, *volatile oil*, *a fatty oil*, and *a resin*, insoluble in cold spirit, and is the most active preparation. An *alcoholic extract*, which is also a good preparation, is less aromatic but more astringent.—*Pharmaceutishes Central-Blatt.* No. 52.

ON THE RADIX SUMBUL.

BY KALLHOFERT.

THE spirituous tincture is of a yellow colour, has a musk-like odour and pungent taste, similar to musk. It is rendered turbid by water, a resin separating which adheres to the sides of the vessel, and an oily substance, which floats on the surface. Sulphuric acid produces with it a red colour, which disappears on the addition of ammonia, with an increase of the musky odour. On evaporation, the tincture leaves a soft resinous substance, forming an emulsion with oil and water, which may be decomposed by boiling with water into 1. *a resin*, and 2. *a balsam*; the former is soluble in acetic acid, the latter insoluble; the residue is only imperfectly soluble in ammonia. The aqueous decoction of the root smells faintly of musk, has a bitter taste, and reacts as an acid. Potassio-tartrate of antimony renders it gelatinous. With tincture of iodine it becomes blue; tincture of galls and alcohol produce a turbidity; and acetate of copper and lead yield precipitates with it. The extract has a yellow-brown colour, is viscid, and both smells and tastes of musk. By repeatedly boiling the root, a yellow wax-like substance at last separates from the decoction. The ethereal tincture has a yellowish tinge, and an acrid flavour, but a very slight musk-like odour; on evaporation, it leaves an acrid balsam, smelling like *rad. imperat.* An alcoholic solution of this residue is first rendered red by sulphuric acid, but subsequently it becomes violet, and then blue; if it be now heated, and allowed to cool, a dirty yellow oily substance separates, which, on application of heat, becomes again brilliantly blue, afterwards purple, and at last black. On incineration, the root leaves 5 per cent. of strongly alkaline ashes, the one-half of which is soluble in water.—*Pharmaceutisches Central-Blatt.* No. 50.

ON THE FIXATION OF THE ODOUR OF MUSK BY WAX.

BY KALLHOFERT.

Kallhofert confirms *Pfeffers'* observation that musk loses its odour in wax capsules, and proves this phenomenon to depend on the odour being thus fixed, as it is by sulphuret of gold, milk of sulphur, lime and syrup of almonds. This odour may in all these cases be restored by adding ammonia.—*Pharmaceutisches Central-Blatt.* No. 54.

THE BISULPHATES OF SODA AND POTASH.

Corresponding experiments by Heumann and Wittstein prove that there exists indeed a crystallizable combination of Na O, $2\,SO_3$, 4 H O, but that it only crystallizes from very *acid* solutions. It becomes rapidly moist in the air, and if it is laid on bibulous-paper, one half of the sulphuric acid is ab-

sorbed with the water by the paper, and a simple sulphate remains. If we endeavour to re-crystallize the salt from an aqueous solution, a neutral salt is formed. By heating, the second atom of sulphuric acid is driven off, but only at a red heat. The double sulphate of potash, on the other hand, which only crystallizes when sulphuric acid is present in excess is anhydrous (*i. e.* it contains no water of crystallization, beyond the water of the second atom of sulphuric acid), and does not effloresce on exposure to the air. It contains 34.6 potash, 58.4 sulphuric acid, and 6.5 water.—*Pharmaceutisches Central-Blatt.* No. 53.

ON THE ANALYSIS OF GUANO.

BY ANDREW URE, M.D., F.R.S., &c. &c.

(*Concluded from page* 382).

F. The *Chilian guano* gathered on the coast, contains a remarkable proportion of common salt, derived probably from the sea spray.

The following is the General Report of the chemical examination of several samples of guano, which I made for Messrs. Gibbs of London, and Messrs. Myers of Liverpool, the co-agents of the Peruvian and Bolivian governments :—

"In these various analyses, performed with the greatest care, and with the aid of the most complete apparatus for both inorganic and organic analysis, my attention has been directed not only to the constituents of the guano, which act as an immediate manure, but to those which are admitted by practical farmers to impart durable fertility to the grounds. The admirable researches of Professor Liebig have demonstrated that AZOTE, the indispensable element of the nourishment of plants, and especially of wheat and others abounding in gluten (an azotized product), must be presented to them in the state of *ammonia*, yet not altogether ammonia in the pure or saline form, for, as such, it is too readily evaporated or washed away; but in the dormant, or as one may say, in the *potential* condition in contradistinction from the *actual*. Genuine Peruvian and Bolivian guanos, like those which I have minutely analyzed, surpass very far all other species of manure, whether natural or artificial, in the quantity of *potential* ammonia, and, therefore, in the permanency of their action upon the roots of plants, while, in consequence of the ample store of *actual* ammonia which they contain ready formed, they are qualified to give immediate vigour to vegetation. Urate of ammonia constitutes a considerable portion of the azotized organic matter in well-preserved guano; it is nearly insoluble in water, not at all volatile, and is capable of yielding to the soil, by its slow decomposition, nearly one-third of its weight of ammonia. No other manure can rival this animal saline compound. One of the said samples of guano afforded me no less than 17 per cent. of potential ammonia, besides $4\frac{1}{3}$ per cent. of the actual or ready formed; others from 7 to 8 per cent. of ammonia in each of these states respectively. The guanos which I have examined are the mere excrement of birds, and are quite free from sand, earth, clay, and common salt, reported in the analyses of some guanos, and one of which (sand) to the amount of 30 per cent., I found myself in a sample of guano from Chile.

"The Peruvian guano, moreover, contains from 10 to 25 per cent. of phosphate of lime, the same substance as bone-dust, but elaborated by the birds into a pulpy consistence, which, while it continues insoluble in water, has been thereby rendered more readily absorbable and digestible (so to speak) by the roots of plants. I have therefore no doubt, that by the judicious application of these genuine guanos, mixed with twice or thrice their weight of a marly or calcareous soil, to convert their phosphate of ammonia into phosphate of lime and carbonate of ammonia, as also to dilute all their ammoniacal compounds—such crops will be produced, even on

inferior lands, as the farmer can scarcely raise upon more improved soils by ordinary manure. To the West India planter, guano will prove the greatest boon, since it condenses in a portable and inoffensive shape the means of restoring fertility to his exhausted cane-fields, a benefit it has long conferred on the poorest districts of Peru.

"I respectfully observe, that no analysis of guano hitherto made public at all exhibits the value of the cargoes referred to above, while none gives the quantity of ammonia dormant in the azotized animal matter of the bird's dung, which, called into activity with the seeds in the soil, becomes the most valuable of its constituents, as a source of perennial fertility. In the detailed account of my analyses of this complex excretion (now preparing for publication), all the above statements will be brought within the scope of general comprehension. I shall also describe my 'ammonia generator,' based on the process invented in the laboratory of Professor Liebig, and also my 'ammonia meter,' which, together, can detect and measure one-hundredth part of a grain weight of absolute ammonia, whether potential or actual, in any sample of guano.

"Meanwhile the following may be offered as the average result of my analyses of genuine guano in reference to its agricultural value :—

"1. Azotized animal matter, including urate of ammonia, together capable of affording from 8 to 16 per cent. of ammonia by slow decomposition in the soil	50	0
2. Water	11	0
3. Phosphate of lime	25	0
4. Phosphate of ammonia, oxalate of ammonia, ammonia —phosphate of magnesia, together containing from 5 to 9 parts of ammonia	13	0
5. Siliceous sand	1	0
	100	0

"Very moist guano has in general more actual and less potential ammonia than the dry guano.

"ANDREW URE."

"*London*, 13, *Charlotte Street, Bedford Square, February* 14*th*, 1843."

Oellacher's analysis of a brownish yellow guano is as follows :—

		Ammonia.
1. Urate of ammonia	12.20	1.07
2. Oxalate of ammonia	17.73	6.50
3. Oxalate of lime	1.30	
4. Phosphate of ammonia	6.00	1.79
5. Phosphate of ammonia and magnesia	11.63	1.68
6. Phosphate of lime	20.16	
7. Muriate of ammonia	2.25	0.72
8. Chloride of sodium (common salt)	0.40	
9. Carbonate of ammonia	0.80	0.23
10. Carbonate of lime	1.65	
11. Sulphate of potash	4.00	
12. Sulphate of soda	4.92	
13. Humate of ammonia	1.06	0.09
14. Substance resembling wax	0.75	
15. Sand	1.68	
16. Water (hygroscopic)	4.31	
17. Undefined organic matter	8.26	
	100.00	12.07

I am satisfied from the large proportion of oxalate of ammonia, that the

sample thus analyzed was by no means a fair or normal specimen of guano; and it is in fact widely different from all the fresh samples which have passed through my hands. It is described as "Knobby, being mixed with light laminated crystalline portions, in white grains, from the size of a pea to that of a pigeon's egg." Having some lumpy concretions of a similar aspect in my possession, I submitted them to chemical examination.

G. 1000 grains being digested in boiling water and strained, afforded a nearly colourless solution. This was concentrated till crystals of oxalate of ammonia appeared. It was then acidulated with hydrochloric acid, to protect the phosphoric acid from precipitation, and next treated carefully with solution of nitrate of lime equivalent to the oxalic acid present. The oxalate of lime thus obtained being converted into carbonate, weighed 80.5 grains, corresponding to 100 of oxalate of ammonia, or 10 per cent. of the guano.

The liquor filtered from the oxalate was precipitated by nitrate of barytes, and afforded 112 grains of sulphate of barytes=38 sulphuric acid; and the last filtrate being mixed with a given measure of ferric acetate, and the mixture supersaturated with ammonia, yielded subphosphate of iron, equivalent to 5 per cent. of phosphoric acid. I digested with heat other 500 grains of the same guano in a weak solution of borax, filtered, acidulated the liquid, but obtained merely a trace of uric acid. It is clear, therefore, that the oxalate of ammonia had been formed in this guano at the expense of the uric acid, and that its concreted state, and the crystalline nodules disseminated through it, were the result of transformation by moisture in a hot climate, which had agglomerated it to a density of 1.75; whereas clean fresh guano friable and dry like the above, is seldom denser than 1.65. This guano contained only 3.23 of ammonia, 65 of insoluble matter, 53 of earthy phosphates, 5 silica, 3 alkaline salts (fixed), and 7 organic matter.

Oxalate of ammonia, being readily washed away, is a bad substitute for the urate of ammonia, urea, and azotized animal matter, which it has replaced. Oellacher could find no urea in the guano which he analyzed; another proof of its disintegration.

Bartels' analysis of a brown-red guano is as follows:—

1. Muriate of ammonia	6.500
2. Oxalate of ammonia	13.351
3. Urate of ammonia	3.244
4. Phosphate of ammonia	6.450
5. Substances resembling wax and resin	0.600
6. Sulphate of potash	4.277
7. Sulphate of soda	1.119
8. Phosphate of soda	5.291
9. Phosphate of ammonia and magnesia	4.196
10. Common salt	0.100
11. Oxalate of lime	16.360
12. Alumina	0.104
13. Sand insoluble in nitric acid and iron	5.800
14. Loss (water and volatile ammonia and undefined organic matter)	22.718
	100.000

Voelckel, in his analysis of guano, states 7 per cent. of oxalate of lime; a result quite at variance with all my experience, for I have never found so much as 2 per cent. of carbonate of lime in the washed and gently ignited insoluble matter; whereas, according to Bartels and Voelckel, from 10 to 5 per cent. of carbonate should be obtained, as the equivalents of the proportions of the oxalate assigned by them.

All these analyses are defective, moreover, in not showing the total quantity of ammonia which the guano is capable of giving out in the soil;

and, since it appears that the freshest guano abounds most in what I have called *potential* ammonia, it must possess, of consequence, the greatest fertilizing virtue.

A sample of decayed dark brown moist guano, from Chile, being examined as above described, for oxalate of ammonia, was found to contain none whatever; and it contained less than 1 per cent. of uric acid.

An article offered to the public, by advertisement, as Peruvian guano, was lately sent to me for analysis. I found it to be a spurious composition; consisted of—

1.	Common salt	31.5
2.	Common siliceous sand	28.0
3.	Sulphate of iron or copperas	5.2
4.	Phosphate of lime	4.0, with
5.	Organic matter from bad guano (to give it smell)	23.3
6.	Moisture	8.0
		100.0

Genuine guano, when burned upon a red-hot shovel, leaves a white ash of phosphate of lime and magnesia; whereas this factitious substance left a black fused mass of sea-salt, copperas, and sand. The specific gravity of good fresh guano is seldom more than 1.66, water being 1.00; whereas that of the said substance was so high as 2.17; produced by the salt, sand, and copperas.

DECOMPOSITION OF SUGAR BY IODIDE OF IRON.

BY FRICKHINGER.

It is a well-known fact that a mixture of iodide of iron and syrup becomes on evaporation black. Frickhinger has examined this mixture with reagents, and found that the iron it contains is still present in the form of an iodide after it has stood for several weeks; but that the sugar has lost its capability of fermenting, and is, at least in part, converted into a brown humic substance.—*Pharmaceutisches Central Blatt.* No. 53.

ON THE PREPARATION OF HYPOSULPHITE OF SODA.

BY M. V. LEGRIP.

The author gives the following as a good and cheap process for the preparation of hyposulphite of soda, now so extensively employed in taking Daguerreotype images:—

Take of Subcarbonate of soda ... 730 parts
Sulphur ..... 45 "
Water ..... 1500 "

Mix the sulphur first, with a small quantity of the water, and then add the soda dissolved in the remainder of the water. Introduce the mixture into two two-necked bottles, which shall not be more than two-thirds filled, then,

Take of Clean iron filings.....1500 parts
Sulphuric acid, (sp. gr. 1.845).....3000 "

Put these into a flask capable of holding two or three times the above quantity. Allow the mixture to cool, and the first portion of disengaged hydrogen to escape, then place the flask on a sand-bath, and by means of tubes of rather large diameter, convey the gas, first into a washing bottle, and then through the two-necked bottles containing the solution. The heat applied to the flask should be gradually increased, so as to produce a regular, but not too rapid evolution of gas.

The process having continued thus for ten or twelve hours, may be stopped. The solutions contained in the two bottles are to be mixed together, filtered, and evaporated, so as to yield crystals of hyposulphite of soda.

The flask will contain sulphate of iron, which may be dissolved out and crystallized.—*Journal de Chimie Médicale.*

ON BRAZILIAN SARSAPARILLA.

BY M. A. RICHARD.

Among the medicines brought from Brazil, there is one of which, hitherto, our information has been very incomplete—this is the sarsaparilla distinguished as Lisbon or Brazilian. This species of sarsaparilla is commonly met with in commerce, and its price is somewhat higher than that of the species brought from Mexico. Its fibres are very long, cylindrical, wrinkled longitudinally, and furnished with some lateral fibrils. Its colour is of a fawn brown, or sometimes of a dark grey, approaching to black. This difference appears to arise from the nature of the soil in which it is grown. The colour internally is nearly white. Its taste is insipid, or rather mucilaginous, and slightly bitter, but the bitterness is only perceived when the root has been kept in the mouth for some time.

This species of sarsaparilla is generally brought from the provinces of Para and Maranham. It is in large cylindrical bundles, long and straight, and the flexible stem of a plant is bound round the bundles, so as entirely to cover them. The fibres are generally free from chump, but when a chump is met with, it is large and knotty, one or two knots being interposed between the stem and the fibres. The stem itself, which varies from the size of the little finger to that of the thumb, has a great number of short prickles enlarged at the bases, and compressed laterally, which are disposed in longitudinal and parallel lines. The Mexican sarsaparilla presents a similar appearance in this respect.

From the researches of Martius and Grisebach, it appears that Brazilian sarsaparilla is the root of the *Smilax papyracea* of Poiret (*Encyc. Meth.* iv., p. 468). It had previously been confounded both with the *Smilax officinalis* of Kunth, and with the *Smilax syphilitica* of Humboldt, both of which are different, but which grow in Brazil. Dr. Grisebach, in the *Flora Braziliensis*, published by Martius and Endlicher, has given a complete description, and an excellent figure of the *Smilax papyracea*. It is an under shrub, the stem of which is compressed and angular below, and armed with prickles at the angles. The leaves are elliptic, acuminate, and marked with three longitudinal nerves. This species grows principally in the regions bordering on the river Amazon, and on the banks of most of its contributory streams. It is known in Brazil by the names of *salsa*, *salsaparilha*, *sarza*, *zarza*, *&c.*

Besides this species, which furnishes the sarsaparilla found in European commerce under the name of Brazilian or Portugal sarsaparilla, there are others which grow in Brazil, such as the *Smilax officinalis*, which grows in the province of Mina, the *Smilax syphilitica*, which grows in the northern regions, and three new species, *Smilax japicanga*, *Smilax Braziliensis*, and *Smilax syringioides*, the roots of which are used by the inhabitants of the provinces in which they grow, for the same purposes as those of the *Smilax papyracea*.

There is also met with in Brazil another plant, *Herreria salsaparilla*, belonging to the same natural order *Smilaceæ*, which abounds in the provinces of Rio de Janeiro, Bahia, and Mina, and the roots of which receive the name of *wild sarsaparilla* (*salsa do mato*). This species is not met with in commerce.—*Journal de Chimie Médicale.*

ON THE COMPOSITION OF THE JALAP RESIN, OBTAINED FROM THE GENUINE JALAP TUBER

(*The Ipomœa Schiedeana of Zuccarini*).

BY DR. G. A. KAYSER.

The resin which I analyzed was prepared from the root pharmacognostically determined as that of the Ipomœa Schiedeana. The root was digested in alcohol of 80 per cent., the extract was mixed with water, and the alcohol was distilled off; the dark-brown resin thus obtained was boiled in water and then washed with hot water, until the water ceased to dissolve any traces of resin. The resin was then re-dissolved in spirit of 80 per cent., and well washed, animal charcoal was added to the solution, until it appeared of a light, slightly yellow colour. The filtered alcoholic solution was now diluted with water, and the alcohol was distilled off. The resin thus obtained was of a slightly yellow colour, and of the consistence of Venice turpentine: it was boiled in distilled water, and afterwards washed several times in water, which dissolves an inconsiderable quantity of resin. When thus purified, and evaporated to dryness over a water-bath, the resin is a slightly yellowish white friable mass which emits the well-known odour of Jalap. For analysis of its elements it was treated in the following manner:—The dry resin was placed in a retort, into which ether was poured and subjected to heat; the ether at first assumed a yellow colour, but more ether was again added, and the boiling was continued until the ether ceased to dissolve any portion of the resin and remained colourless. But in order to remove every particle from the resin which might be soluble in ether, the resin was again dissolved in a little alcohol and precipitated from the solution with ether. A considerable quantity of ether is necessary for this purpose, as the resin is not insoluble in ether containing spirit. In this manner a colourless transparent resin was obtained, a thin layer of which when spread on a glass-plate could scarcely be distinguished by the eye. The resin was now evaporated over a water-bath and dried.

The properties of the resin, purified as far as it was possible in this manner, were the following:

When pulverized, it constituted a white powder without taste or odour; insoluble in water and ether, but readily soluble in alcohol. From the alcoholic solution the resin is precipitated in form of a white powder by water, and is perfectly soluble in ammonia and acetic acid. The alcoholic solution reacts as a weak acid. In potash, soda, and carbonated alkalies, this resin is slightly soluble when cold, but when exposed to heat, perfectly soluble; and it is not precipitated from this solution on addition of acids. In a cold solution of caustic ammonia it is perfectly soluble, and presents a light brown colour; on driving off the excess of ammonia by heat, a neutral solution is obtained, which mixes with water or alcohol in any proportion. This neutral solution of the ammoniacal salt is not precipitated by nitrate of silver, neutral acetate of lead, chloride of barium, or sulphate of copper; but by basic acetate of lead, a flocculent precipitate is obtained. The solutions of the potash and soda salts bear the same relations as the ammoniacal salt to the above named reagents. To obtain a tangible combination of the resin with the mineral oxides in a soluble form, a solution of the ammoniacal salt was boiled with slaked lime until no more ammonia was disengaged: thus a salt of lime was formed, which was soluble in water and spirit, but muriatic acid did not precipitate the resin from the solution. Hydrate of barytes, used in the same manner, produced a similar salt of barytes. Acetic acid readily dissolves the resin; concentrated nitric acid dissolves it without decomposition, and it is again precipitated from the solution on addition of ammonia; dilute nitric acid does not dissolve it, unless heat be applied, and then a decomposition takes place; in cold dilute sulphuric acid it is insoluble, and by concentrated

sulphuric acid it is decomposed. Placed on a watch-glass, and moistened with the concentrated acid, each grain assumes, in about ten minutes, a beautiful crimson colour, and is then dissolved; the fluid assumes a darker colour, and in a few hours a brown-black resinous substance is separated. Heated on a platina spoon, the resin at first melts, becomes brown with the development of a peculiar empyreumatic odour, and then burns with a bright flame, and with smoke; but leaves a spongy shining coal, which is ultimately entirely consumed. At 302° Fahr., it melts to a bright yellow transparent mass, but loses no water.

The resin was dried at 212° Fahr., and burnt with chromate of lead; in this way its composition was ascertained to be the following:

	I.		II.
Carbon.....	56.49	.....	56.35
Hydrogen.....	7.94	.....	7.89
Oxygen	35.57	.....	35.76
	100.00	.....	100.00

As the resin does not appear to combine with bases, without undergoing a change, I endeavoured to obtain the substance into which it is converted by treatment with alkalies, in order to determine the atomic weight of the resin by the composition of this substance and its salts.

The characteristic property of the resin to assume a beautiful crimson colour with concentrated sulphuric acid, caused me to give it the name of *rhodeoretine*, from ῥόδειος, *rose-coloured*, and ῥητίνη, *resin*.

By adding to an aqueous solution of the ammoniacal salt, acetate of lead a white flocculent precipitate was obtained, which was washed with water, and presented itself when dry as a white powder, which is a salt of the resin with lead. To obtain the resinous acid from this salt, it was mixed with distilled water and subjected to a stream of sulphuretted hydrogen, until it was entirely decomposed. The fluid when filtered off the sulphuret of lead is clear, like water, and yields on evaporation in a water-bath, a slightly brown resinous substance, which from its analogy to the original resin, and its bearing the same relation to sulphuric acid, I have called *hydrorhodeoretine*. In composition it differs from the former resin by one equivalent of water:—

	I.		II.
Carbon	55.10	...	55.16
Hydrogen	8.28	...	8.39
Oxygen.....	36.62	...	36.45
	100.00		100.00

Salts of potash and barytes were formed from the hydrorhodeoretine, which were separately analyzed, and gave, for the acid in the salts, the following composition:—

42 equivalents	Carbon.....	3185.8
36 ,,	Hydrogen.....	449.3
21 ,,	Oxygen.....	2100.0
	Atomic Weight.....	5735.2

In calculating the empirical formula for rhodeoretine at 42 equivalents of carbon, a composition is obtained, agreeing very well with the per centage composition arrived at by analysis, *viz.*:

		Calculated in 100 parts.
42 Eq. Carbon	3185.9	56.66
35 ,, Hydrogen	436.8	7.78
20 ,, Oxygen	2000.0	35.56
Atomic weight.....	5622.7	100.00

The constitution of the analyzed substances was as follows:

Rhodeoretine	$C_{42} H_{35} O_{20}$.
Hydrorhodeoretine.....	$C_{42} H_{36} O_{21}$.
The Salt of Lead.....	$C_{42} H_{36} O_{21} + 2$ Pb O.
The Salt of Barytes.....	$2 (C_{42} H_{36} O_{21}) +$ Ba O.
The Salt of Potash	$3 (C_{42} H_{36} O_{21}) +$ K O.

It would, therefore, appear that rhodeoretine combines with bases, on taking up 1 eq. of H. O. by which it is converted into hydrorhodeoretine.

By passing a stream of muriatic acid gas through an alcoholic solution of rhodeoretine, and allowing the dark redish-yellow fluid to stand for a few days, I obtained an oily fluid floating on the surface, which was soluble in ether. Its composition was—

	I.		II.
Carbon.....	66.95	.....	66.65
Hydrogen.....	10.67		
Oxygen.....	22.38		
	100.00		

I named it *rhodeoretinol*, from its origin and consistence. A solution of hydrorhodeoretine treated with muriatic acid gas yielded a similar oleaginous substance.

Examination of the portion of the Jalap Resin soluble in Ether.

The ethereal solution of the resin, which was of a dark yellow colour was evaporated in the air, when a brownish yellow clear fluid mass separated, which on being dissolved in spirit separated on addition of water as a brownish oily mass, the small portion of rhodeoretine which was mixed with it separating at the same time. When this mass was purified, by being redissolved in spirit and again precipitated by water, it had the following properties:—It reddened the litmus paper, leaving a fatty stain on the paper, it had a very powerful unpleasant odour, similar to that of jalap, and an acrid taste, was insoluble in muriatic, nitric, and acetic acids, even when heated. It was soluble in an aqueous solution of potash or soda, and was separated from the solution by muriatic acid without undergoing a change. An alcoholic solution of acetate of lead precipitated the alcoholic solution with a yellow colour; it neither crystallized from the ethereal nor from the alcoholic solution, and remained even after several months as a soft viscid mass. Kept in contact with water for a long time, it crystallized and was converted into a mass of prismatic needles, which were connected together, and after the lapse of several months it presented itself as a viscid mass. It follows then, that this mass belongs to the crystallizable soft resins, or fatty acids, and that the odour of the jalap depends on it. Heated on a platina spoon it evaporated, and when lighted burnt with a bright flame, diffusing an unpleasant acrid odour.—*Annalen der Chemie und Pharmacie.* Band xli., Heft i.

VALERIANATE OF QUININE.

BY DR. E. DEVAY.

This salt is prepared by adding valerianic acid, in slight excess, to a concentrated alcoholic solution of quina. The solution thus formed is to be diluted with twice its volume of distilled water, and then submitted to a heat not exceeding 122° Fahr. As the spirit evaporates the valerianate of quina is deposited in fine crystals, either isolated or grouped, which augment from day to day.

The valerianate of quina may also be prepared by double decomposition, from sulphate of quina and valerianate of lime; but this method does not answer so well as the preceding.

By whatever process this valerianate is prepared, it is important to observe that its solution should be evaporated by a very gentle heat, and, finally that the crystals should be dried from the mother-liquor by merely exposing them to a dry atmosphere.

The valerianate of quina may be recognised in the following manner :—

1. A precipitate is formed on adding a concentrated alcoholic solution of valerianate of quina to a concentrated and neutral aqueous solution of nitrate of silver, but this precipitate is redissolved in a large quantity of water.

2. An aqueous solution of valerianate of quina gives no precipitate with chloride of barium.

3. On boiling an aqueous solution of valerianate of quina, the hydrated valerianate separates in globules resembling oil.

4. On adding an acid to the aqueous solution, the valerianic acid is disengaged, and may be recognized by its smell.

According to the analysis of the Prince de Canino, the valerianate of quina consists of one equivalent of valerianic acid, one equivalent of quina, and two equivalents of water, of which last, one equivalent constitutes water of crystallization. The crystalline appearance of the salt varies, it is either octahedral or hexahedral.

It has a slight smell of valerianic acid, and a bitter taste resembling that of quina. It dissolves easily in water at ordinary temperatures, and still more easily in alcohol ; olive oil, with the aid of a slight heat, also dissolves it.

It is decomposed by the mineral acids, and by most of the organic acids. Submitted to a heat of 194° Fahr., the crystallized salt loses one equivalent of water, becomes soft, and then fuses like a resinous substance. When thus deprived of water, it is insoluble in water, but very soluble in spirit. On submitting it to a still higher temperature, the second atom of water is not driven off, but the salt is decomposed with disengagement of the vapours of mono-hydrate of valerianic acid. The aqueous solution of the salt submitted to a boiling temperature is also decomposed, and oily drops are seen floating on the surface of the liquor, which consist of the mono-hydrated valerianate.

The valerianate of quina, like the valerianate of zinc, being very easily decomposed, should be administered in the most simple forms. Dr. Devay usually administers it in some mucilaginous vehicle, in the proportions of five parts of the salt to one hundred of liquid.

The perfect solubility of the salt in oil, offers a great advantage in its use as an external application. It may be thus dissolved in the proportions of one part to sixty parts of oil.

The author has arrived at the following conclusions with regard to its therapeutical action :—

1st. That the valerianate of quina is a more powerful *antiperiodic* than the sulphate of the same base, even when administered in smaller doses.

2d. It seems indicated, from its specific actions, as a valuable remedy in fevers of the worst character.—*Journal de Pharmacie.*

MERCURIAL SOAP OF M. HEBERT OF PARIS.

Take of mercury and nitric acid, each 125 grammes.

Put these ingredients into a matrass capable of holding twice the above quantity, and stir the mixture from time to time, until the solution shall have been effected at the ordinary temperature of the atmosphere.

Introduce into a porcelain capsule, 530 grammes of calf's fat, melt this by the heat of a water-bath, and then add the solution of mercury, stirring the ingredients together until they have acquired an adhesive consistence. To 150 parts of the ointment thus formed, add 60 parts of caustic solution

of soda, sp. gr. 1.33, and rub them together on a porphyry slab until combination be effected, when a soap will be formed, perfectly soluble in water.

This soap is employed with success by some medical men in cutaneous affections. It may be employed by anointing the part with it, either alone or with water, but its use should be immediately suspended on the appearance of any local irritation.—*Journal de Pharmacie.*

ON LACTUCARIUM AND SYRUP OF LACTUCARIUM.

BY M. AUBERGIER.

The author having discovered that spirit of sp. gr. .926, easily separated the active principles of lactucarium from the wax, the resin, and other inert substances which it contains, proposes to prepare a syrup of lactucarium in the following manner :—

Exhaust the lactucarium by twice treating it with spirit sp. gr. .926 ; distil the tincture thus obtained, by the heat of a water-bath, when a brown extract, bitter and deliquescent, will be left. This extract may be used in the form of pills, or may be made into the syrup by adding one part of extract, dissolved in a small quantity of boiling water to 500 parts of boiling simple syrup. The syrup will become opaque as it cools, but there will be no deposit.—*Journal de Chimie Médicale.*

REVIEWS.

A Thermometrical Table, *on the Scales of Fahrenheit, Centigrade, and Reaumur; comprising the most remarkable Phenomena, Chemical and Pharmaceutical, connected with Temperature. By* Alfred S. Taylor.

This table consists of an enlarged drawing of a thermometer, on which are represented the three scales of Fahrenheit, Centigrade, and Reaumur, so that the relation between these scales is at once seen. On each side of the drawing are enumerated a great number of phenomena, which occur at the temperatures indicated by the degrees opposite which such phenomena are written. Thus we have the fusing or melting points, the boiling and congealing points, of a vast variety of substances indicated, in addition to many other facts of this description ; and these are found by referring to that part of the scale to which the enquirer would be directed by a previous knowledge of the probable temperatures at which the phenomena may occur.

A Toxicological Chart, *exhibiting at one View the Symptoms, Treatment, and Modes of detecting the various Poisons, &c. By* William Stowe, Member of the Royal College of Surgeons of England. *Tenth Edition.* S. Highley, London.

The Pharmaceutical Chemist ought to possess a certain amount of Toxicological knowledge ; he should be able to determine at once what is the proper antidote to be administered in any case of emergency ; he should possess a general knowledge of the

symptoms produced by the different poisons; and should be able to distinguish one poison from another, and to recognise any one by the application of chemical tests; and when this knowledge is called into requisition, it is generally necessary that a prompt and decisive judgment should be formed. The object of Mr. Stowe's Chart is to give, in a tabulated form, a statement of the leading facts connected with the treatment of cases of poisoning. It is intended to be fixed against a wall, so that instant reference can be made to it, for the purpose of refreshing the memory, or confirming a decision as to the course to be pursued in any particular case. Opposite the name of each poison is given, in separate columns, first, *the symptoms;* then *the treatment;* and, lastly, *the tests.* That this Chart has been found extensively useful may be inferred from the fact, that it has reached a tenth edition.

ROYAL INSTITUTION.

ON THE LIQUEFACTION AND SOLIDIFICATION OF BODIES GENERALLY EXISTING AS GASES.

BY MICHAEL FARADAY, ESQ., F.R.S.

On Friday evening, the 31st of January, Professor Faraday delivered a lecture on the above subject, at the Royal Institution, and liquefied olefiant gas before the audience. He expressed his belief that hydrogen would hereafter be solidified, and that it would prove a metal. He had entertained hopes of being able to show liquefied oxygen at the lecture, but had failed in obtaining it, owing, as he believed, merely to a defect in the apparatus.

The substance of the lecture is contained in a paper read at the Royal Society, on the 16th of January last, of which the following is an abstract:—

"The method employed by the author for examining the capability of gases to assume the liquid or solid form, consisted in combining the condensing powers of mechanical compression with that of very considerable depressions of temperature. The first object was obtained by the successive action of two air-pumps, the first having a piston of one inch in diameter, by which the gas to be condensed was forced into the cylinder of the second pump, the diameter of whose piston was only half an inch. The tubes, into which the air thus further condensed was made to pass, were of green bottle glass, from one-sixth to one quarter of an inch in external diameter, and have a curvature at one portion of their length adapted to immersion in a cooling mixture; they were provided with suitable stopcocks, screws, connecting pieces, and terminal caps, all carefully made, and rendered sufficiently air-tight to retain their gaseous contents, under the circumstances of the experiments, and when they were sustaining a pressure of 50 atmospheres, as ascertained by mercurial gauges connected with the apparatus. Cold was applied to the curved portions of the tube, by their immersion in a bath of

Thilorier's mixture of solid carbonic acid and ether. The degree of cold thus produced, when the mixture was surrounded by the air, estimated by an alcohol thermometer, was a temperature of 106° Fahr. But on placing the mixture under an air-pump, and removing the atmospheric pressure, leaving only that of the vapour of carbonic acid, which amounted only to one-24th of the former (that is, to the pressure of a column of 1.2 inch of mercury), the thermometer indicated a temperature of 166° below zero, of Fahr. scale. In this state the ether was very fluid, and the bath could be kept in good order for a quarter of an hour at a time. The author found that there were many gases, which, on being subjected to cold of this extreme intensity, condensed into liquids, even without a greater condensation than that arising from ordinary atmospheric pressure ; and that they could then be preserved sealed up in glass tubes in this liquid state. Such was the case with *chlorine*, *cyanogen*, *ammonia*, *sulphuretted hydrogen*, *arseniuretted hydrogen*, *hydriodic acid*, *hydrobromic acid*, *carbonic acid*, and *euchlorine*. With respect to some other gases, such as *nitric oxide*, *fluosilicon*, and *olefiant gas*, it was difficult to retain them for any length of time in the tubes, in consequence of the chemical action they exerted on the cements used in the joinings of the caps and other parts of the apparatus. *Hydriodic* and *hydrobromic acids* could be obtained either in the solid or liquid state. *Muriatic acid gas* did not freeze at the lowest temperature to which it could be subjected. *Sulphureous acid* froze into transparent and colourless crystals, of greater specific gravity than the liquid out of which they were formed. *Sulphuretted hydrogen* solidified in masses of confused crystals of a white colour, at a temperature of—122° Fahr. *Euchlorine* was easily converted from the gaseous state into a solid crystalline body, which, by a slight increase of temperature, melted into an orange red fluid. *Nitrous oxide* was obtained solid, at the temperature of the carbonic acid gas in vacuo, and then appeared as a beautifully clear and colourless crystalline body. The author conceives that in this state it might in certain cases be substituted with advantage for carbonic acid in frigorific processes, for arriving at degrees of cold far below those hitherto attained by the employment of the latter substance. *Ammonia* was obtained in the state of solid white crystals, and retained this form at a temperature of—103° Fahr. The following liquids could not be made to freeze at 166° Fahr. below zero, viz., *chlorine*, *ether*, *alcohol*, *sulphuret of carbon*, *caoutchoucine*, *rectified oil of turpentine*. The following gases showed no signs of liquefaction when cooled by the carbonic acid bath, even when subjected to great pressure, viz., *hydrogen* and *oxygen*, at a pressure of 27 atmospheres ; *nitrogen* and *nitric oxide* at a pressure of 50 atmospheres ; *carbonic oxide*, at a pressure of 40 atmospheres, and *coal gas* at a pressure of 32 atmospheres."

HOUSE OF COMMONS.

On Tuesday, February 18, the day which had been fixed for the first reading of the Medical Bill, Sir James Graham postponed his motion until Tuesday, February 25.

Sir Robert Peel has announced his intention to abolish the duties on drugs, which, it appears, are scarcely sufficient in amount, at the present reduced rate, to cover the expenses of collecting. The duties on glass, sugar, and several other commodities in general consumption, are likely to be removed. The details of the measure not being published at the time of going to press, we defer our remarks on it until next month.

TO CORRESPONDENTS.

Mr. J. O. Day was answered by post as requested, December 17th, and the letter has just been returned.

B. R. S.—(1.) For a method of detecting the presence of iron in water, see page 78 of this volume.—(2.) Oxalate of ammonia is one of the best tests for lime.—(3.) Caustic potash throws down from alum a precipitate which is soluble in excess of the alkali. This precipitate, heated in a blowpipe flame, with a salt of cobalt, assumes a bright blue colour. Nitrate of barytes indicates the presence of sulphuric acid in alum, by throwing down a white precipitate insoluble in nitric acid.—(4.) *Parnell's Chemical Analysis.*

"A Friend."—The mode of detecting alum, described by our Correspondent, is correct as far as it goes. See also the above No. (3.)

A.X.—(1.) *Dr. Christison's Treatise on Poisons*, 18*s*.—(2.) *The Gardener's Chronicle*, edited by Dr. Lindley.—(3.) *The Chemical Gazette* is published twice in the month, price 6*d*.—(4.) See any work on Chemistry.

W.C., in reply to A. T. Q., gives the following formula for Black Japan for Leather:—

Boiled linseed oil, 4 pints.
Burnt umber, in powder, 4 ounces.
Asphaltum, 3 ounces.
Oil of turpentine enough to give it the proper consistence.

Melt the asphaltum, and add the linseed oil (hot) gradually, then add the burnt umber, and lastly the oil of turpentine.

Mr. May objects to the practice of publishing in the Journal formulæ for various compounds sold by Chemists and Druggists. This practice, he considers, gives an undue advantage to the idle and ignorant, by placing them in possession of information obtained by others at the expense of labour and research, and who thus lose the benefit of the superiority they ought to enjoy. Mr. May thinks that the answers to inquiries should be given in general terms, conveying the knowledge of scientific principles, rather than their special applications. [There is much justice in these remarks: at the same time it would be difficult to convince some of our correspondents that this is the case. We are often accused of not giving enough *practical* information.]

H.C.M. has observed tincture of orange peel to become turbid by mixture with water. [We can only account for the fact by supposing that the tincture was made with fresh orange peel, containing a large proportion of essential oil.]

"A Member" has sent for our opinion samples of extract of hyoscyamus, and sesquicarbonate of soda. [We should not be justified in giving any such opinion, especially to an anonymous Correspondent. It is not our province to arbitrate in matters of this kind.]

"Omega."—See *Lerebour's Treatise on Photography*, translated by J. Egerton.

"Tyro" asks for directions as to the manner of using the hydrogen night lamp. [Turn the cock and the jet of gas which escapes will be ignited by the spongy platinum. Then apply a candle.]

J. W.—See the notice in the cover of our last number.

J. J. P.—(1.) Castor oil occasionally deposits a sediment in very cold weather.—(2.) The addition of a little oil to compound colocynth pill tends

to prevent its becoming hard.—(3.) There is no authorised formula for infusum taraxaci. It might be made in the same proportion as the decoction.

A. B. C. wants a formula for red ink, containing no acid, to be used with steel pens. [We believe a solution of carmine in ammonia, with a little gum, will answer the purpose.]

J. G.—It is not our business to obtain for publication the private formulæ of individuals.

H. G. W.—We are obliged by the communication, which will be noticed shortly.

"Aqua" wishes for some practical information respecting the manufacture of aërated waters, as he finds he cannot make them to compete with Schweppe. [We should advise our Correspondent to enquire of Messrs. Schweppe on what terms they would take an apprentice.—See *Soubeiran's Notice sur la Fabrication des Eaux Minérales Artificielles.* Paris, 1843. 4 fr.

"A Subscriber," Leamington (post-mark Coventry) wishes to know the best and *cheapest* mode for making chloric ether. [The *economy* of processes of this kind involves manipulations which are known only to the manufacturers].

"Juvenis" (Horncastle).—(1). The usual ingredients of a black draught are sulphate of magnesia, tincture and infusion of senna, with manna or liquorice to make it pleasant.—(2). Why is essence of lemon changed into turpentine by keeping. [We never heard that this was the case].—(3). It is difficult to powder asafœtida without drying it, and thus injuring its aromatic properties. In cold weather it may sometimes be rubbed into powder with sugar.

F. W.—The Pharmacopœia gives no instructions for the separation of the seeds from poppy capsules.

"Inquisitor" not having been in business for himself at the date of the Charter, cannot be admitted as a Member of the Pharmaceutical Society without examination.

"Emeticus" wishes to pass Apothecaries' Hall. [For this purpose he must either be apprenticed to an Apothecary, or wait until Sir James Graham's Medical Bill has passed, when it is likely that the apprenticeship system will be abolished. For information respecting the course of study, application should be made to the Hall.]

Q. R.—See vol. ii., No. 8.

Mr. Arnott.—We think the formula is not a good one.

P. H.—Pot Pourrie, *see* Scented Powder for bags, page 339 of our last number.

"A Constant Reader" (Brighton).—*See* vol. iv, page 340.

X. Z.—See the Advertisement.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street, before the 20th of the month.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. X.—APRIL 1st, 1845.

SIR JAMES GRAHAM'S BILL
FOR THE REGULATION OF MEDICINE AND SURGERY.

While our last number was in the press, this bill was introduced to the notice of the House of Commons, and from the reception it met with, we anticipated that it would be found, on examination, to give general satisfaction. Mr. Wakley, who had up to that time been at the head of the opposition, expressed "very great satisfaction at the statement of the Right Hon. Baronet; he earnestly hoped and really believed, that the difficulties which beset this subject would be amicably arranged and finally settled."

If we had thought it right to stop the press for the purpose of giving a hasty report on the subject, we should, in general terms have reiterated the sentiments of Mr. Wakley, and congratulated our readers on a more speedy termination of the medical contentions than had been previously anticipated.

But we thought it better to defer our remarks until time had been allowed for digestion, and we are sorry to find that the result has shown the propriety of this decision. We still hope and believe, that the differences which have for many years disturbed the harmony of the profession will be satisfactorily arranged; but we regret to observe that there are still some points on which opinions differ.

In consequence of the dissatisfaction which had been expressed, respecting the bill in its original form, and the suggestions which had been offered by the profession, Sir James Graham has made several important modifications. In his address to the House, he stated, distinctly, his determination to protect the interests of the general practitioners, and to provide for the representation of that body in the Council of Health. Instead of repealing entirely the Apothecaries' Act of 1815, he now proposes to continue the powers hitherto possessed by the Society of Apothecaries, of prosecuting unqualified practitioners, so far as relates to persons not

registered according to the new bill. The clause for the restraint of unqualified persons is amplified, and more clearly expressed. It now stands as follows :—

"And be it enacted, That every unregistered person who shall wilfully and falsely pretend to be, or take or use the name or title of Physician, Doctor, Bachelor, or Inceptor, in the faculty of Medicine, or Surgeon or Licentiate in Medicine and Surgery, or Apothecary, or any name, title, or addition, implying that he is registered under this Act, or recognized by law as a Medical or Surgical Practitioner, shall be deemed guilty of a misdemeanour in England and Ireland, and in Scotland of a crime and offence ; and being convicted thereof shall be punished by fine or imprisonment, or both, as the court before which he shall be convicted shall award."

It is unnecessary for us to describe minutely all the modifications introduced in to the bill, as they do not individually concern our body, but it must be quite evident to every unprejudiced person, that Sir James Graham is sincerely desirous of doing justice to all parties, and rendering a service to the whole profession. Mr. Wakley observed, on the occasion of the introduction of the bill, "I am so satisfied that the right hon. gentleman, from the alterations he has proposed, is anxious to conciliate all parties in the profession, and to listen attentively and deliberately to the various suggestions that may be made, that I have only now to request that he will not propose the second reading of the bill at an early period, but give time for the most mature consideration of its provisions by the profession." Accordingly Sir James Graham, without hesitation, consented to postpone the second reading until after Easter.

On the 14th of March a meeting of general practitioners was held, at which about twelve hundred were present. "The National Association of General Practitioners" laid a report before the meeting, in which they commented upon the modified bill and expressed dissatisfaction on two points. First, They desire "a more efficient penal clause againt unlicensed practitioners." Secondly, They advocate certain modifications in the powers of the Council of Health, and also in the regulations respecting education and examination, which will, in their opinion, "have a direct tendency to elevate the character, and increase the usefulness of all classes of the Medical profession alike."

It would be difficult to construct a "penal clause" which would

meet the views of the parties who raise these objections. The clause above quoted appears to us to be as stringent as it could possibly be made, *consistently with the welfare of the public.* If it were carried further it would amount to this, that no person should be allowed to take a dose of medicine excepting by medical advice. The English public would not submit to such a restriction. It is stated by a correspondent (page 462) that Mr. Wakley intends to propose a clause prohibiting the sale of opiates by Chemists and Druggists! We think this must be a mistake, as it would be a reflection upon the judgment and common sense of that gentleman to suppose him capable of entertaining such a proposition. That opiates and other powerful and dangerous medicines ought not to be sold by persons unacquainted with their properties, doses, and effects, we readily admit. This is a maxim which we have always advocated, and our present number (page 463) contains additional evidence of the necessity of some restraint in reference to the practice of Pharmacy. But if the Chemists are to become a legally educated body, which we trust will be the case before the expiration of another year, the chief cause of such fatal accidents will be at an end.

If it should be proposed to place on Chemists and Druggists any restriction which would interfere with the legitimate exercise of their calling in any respect, and thus operate injuriously on the welfare of the public, it will be the duty of our body to unite in opposing such a measure. We have always advocated judicious restrictions in the profession; but we are convinced that the endeavour to carry these restrictions beyond that point at which they are beneficial to the public, would defeat the object by raising up opposition, and thus adding to the difficulty which already exists in making an arrangement satisfactory to all parties.

We have no hesitation in expressing a sincere hope that the bill of Sir James Graham will speedily become the law of the land. We are informed that it is intended, as soon as this shall have taken place, to introduce a bill for the regulation of Pharmacy. Thus the object for which our body has been striving for

several years, is dependent upon the success of the measure now before Parliament. The general principles of that measure are strictly in accordance with those which we have frequently had occasion to advocate, and which we believe to be calculated to promote the welfare of the profession and the public.

It is, therefore, our duty to exert all the influence we possess to promote the success of the bill, and at the same time carefully to watch its progress through the Committee of the House, lest by any verbal alteration in its clauses its original constitution should be perverted.

The disputes between the College of Surgeons and the Surgeons who compose the College, do not concern us; and although we observe these contentions with regret, we make no further comment upon the subject. We cannot however avoid remarking that the spirit with which Sir James Graham's original bill was re-received by some parties in the profession was needlessly intemperate. It might have been supposed by any person unacquainted with the facts of the case, who chanced to read the criticisms which have been made on it, that the author of the bill was interested in producing a measure which would be injurious to the majority of those for whom it was designed. The injustice of any such insinuation is too obvious to deserve notice. It was in consequence of an earnest request on the part of the profession, when all the previous endeavours had failed, that the government was prevailed upon to undertake the task. A bill, professedly in a crude state, was laid before the public at the close of last session, for the express purpose of allowing all the parties concerned ample time to consider its tendency and offer suggestions. Notwithstanding the discourteous manner in which these suggestions have been offered, Sir James Graham has evinced an unequivocal disposition to conciliate and meet the views of the dissentients. His only object is the introduction of a judicious and salutary law. The profession itself cannot construct or invent a law which would please all parties; the least they can do, therefore, is to facilitate rather than to obstruct the progress of the minister, who has undertaken the arduous task of assisting them in their difficulty.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF A LECTURE ON CRYSTALLOGRAPHY.

BY MR. TENNANT, F.G.S.,
Lecturer on Mineralogy, at King's College, London.

Delivered at No. 17, *Bloomsbury Square, February* 26, 1845.

The lecturer began by defining a *crystal as an inorganic solid, possessing a homogeneous structure, and bounded by plane surfaces symmetrically arranged.*

The term *crystal* is derived from the Greek κρύσταλλος, signifying *ice*. The Roman naturalists applied the term afterwards to what is now called rock crystal, they supposed it, both from its transparency and beautiful symmetrical forms, to be water indurated by continued frosts in the mountainous regions of the Alps.

Reference was made for examples to some large specimens of rock crystal, in the magnificent collections of the British Museum and Royal Institution, also to one from Mexico, weighing about 180 pounds, lately exhibited in London by an American, and to one in the museum at Paris of even much larger size.

A large number of salts and mineral substances are found crystallized with more or less regularity among the minerals. The forms assumed by some are numerous and highly interesting. Carbonate of lime was stated to be found in nearly four hundred varieties of form. The diamond, red oxide of copper, fluor spar, iron pyrites, and oxide of tin, also exhibit numerous varieties of crystals.

On breaking a crystal, it is found to possess a regular internal structure, which has been termed in works on Mineralogy, its primary form. For instance, from any of the numerous crystallized varieties of the diamond, an octohedron may be obtained by cleavage; as also from those of calcareous spar, a rhomb. The lecturer illustrated this by taking a large stone picked up in the bed of the Derwent, near Matlock, having all the edges and angles of the original crystal destroyed by attrition; by giving it a slight blow with a hammer, it broke readily into numerous fragments of a rhombic form with bright surfaces. He stated, that if the fragments were measured by an instrument invented by Dr. Wollaston, called a goniometer, they would be found definite in their form, the obtuse angle being 105° 5′, and the acute 74° 55′: by this form, the stone might be known to be *calcareous spar*. Galena was next referred to as yielding a cube

by cleavage. He next proceeded to describe the *striæ* on some crystals, which are fine lines found frequently on the faces. To make this intelligible to our readers, we have introduced two

Fig. 1.

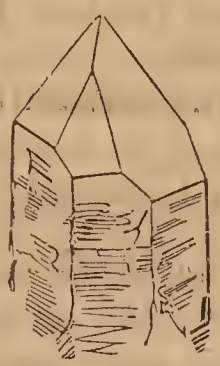
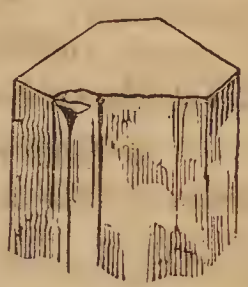


Fig. 2.



figures, the first is that of a six-sided prism of quartz, terminated by a six-sided pyramid. On each face of the prism will be observed fine lines, running in the *transverse* direction of the crystal; while on the second, which is a six-sided prism of *beryl*, the *striæ* are in the longitudinal direction. Topaz has also striæ in the longitudinal direction, but its crystals are found in the rhombic form.

The lecturer next described the primary and secondary forms of crystals, stating that different authors had selected different numbers of crystals as the primary forms. Mr. Brooke, in his introduction to crystallography, gives fifteen primary forms as follow :—Cube—Tetrahedron—Octohedron—Rhombic dodecahedron—Octohedron with square base—Octohedron with rectangular base—Octohedron with rhombic base—Right square prism —Right rectangular prism—Right rhombic prism—Right oblique angled prism—The oblique rhombic prism—Doubly oblique prism—Rhomboid.

Large paper models of the above, and numerous diagrams exhibiting the various modifications of each, were shown. A number of wire models to illustrate the following six systems described by Professor Miller, of Cambridge, and others, were exhibited and explained, viz. :—Octohedral system—Pyramidal Rhombohedral—Prismatic—Oblique prismatic—Doubly oblique prismatic.

A statement was then given of some of the different speculations that had been adopted by various writers to account for the form of the ultimate particles composing the different crystals. The most important writers on crystallography were enumerated, including Epicurus, Linnæus, Bergman, Werner, Abbe Haüy, Romé de Lisle, Brook, Phillips, Wollaston, Daniell, Mohr, Miller, and others; and reference made to the following works :—

Familiar Introduction to Crystallography, by Henry James Brooke. London, 1823.

The article "Crystallography," by the same author, in *Encyclopædia Metropolitana.*

Treatise on Crystallography, by W. H. Miller. Cambridge, 1839.

Dana's Mineralogy. New York and London, 1844.

It was next stated, that in order to obtain crystals, it is necessary that the particles should have freedom of motion. Common salt or alum may be dissolved in water; if in a glass vessel, any rough substance, such as a cinder, may be placed in the solution, and by allowing the water to evaporate slowly, the crystals will be deposited on the rough substance in preference to the glass vessel.

PHARMACEUTICAL MEETING,

MARCH 12th, 1845,

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

The following abstract of the minutes of proceedings of the Scientific Committee for the promotion of PHARMACOLOGICAL KNOWLEDGE, was read:—

SCIENTIFIC COMMITTEE,

March 1, 1845.

Present—Mr. MORSON, Vice-President, in the Chair.

SIR JAMES CLARK, Bart.	Mr. BELL
W. T. BRANDE, Esq.	" DEANE
DR. FARRE	" SQUIRE
DR. PEREIRA	" WAUGH
DR. A. T. THOMSON	

T. REDWOOD, *Honorary Secretary.*

Dr. Pereira and Dr. Royle, who, at the previous meeting of the Committee, had undertaken to draw up lists of Pharmacological desiderata, for distribution in different parts of the world, presented the following List of Queries for the island of Ceylon:—

PHARMACOLOGICAL DESIDERATA FOR THE ISLAND OF CEYLON.

1. Full description, with specimens in flower and fruit, of the scitamineous plant, which produces the fruit imported into Europe from Ceylon, under the name of the *Long*, *Wild*, or *Ceylon Cardamom.* The plant is believed to be the one termed by Moon (*Catalogue of the Indigenous and Exotic Plants growing in Ceylon*) the *Alpinia Granum paradisi*, and which is stated to be cultivated in the island, where it is called *Ensāl.* An account of the cultivation, uses, and commerce of this article is desired, as scarcely anything is known in Europe of its natural history:

the plant having been confounded with the true grain of paradise plant of the western coast of Africa.

2. An astringent dark brown extract, usually in the form of round flattened cakes, covered on one side with paddy husks; is imported into England from Ceylon, and is known by the name of *Colombo Catechu*. Is it the produce of the island of Ceylon? If so, from what plant is it obtained? by what process, and in what part of the island is the manufacture practised? It is conjectured to be the produce of the seeds of the *Areca Catechu* of Linnæus. Moon says, that the Singalese name for this palm is *Puwak*, and that two varieties of it are cultivated: one astringent and called *Kahata*, the other yellow and termed *Tæmbili*. Is the extract referred to procured from the variety called Kahata?

3. *Croton seeds* and *Croton oil* are imported into Europe from Ceylon. It is desired to know whether these are obtained exclusively from one sort of plant? Dr. Hamilton (*Transactions of the Linnean Society of London*, vol. xiv., p. 257) says, that in India, Croton seeds are obtained from two species of *Croton*, one of which he calls *C. Jamalgota*, and which is probably the *C. Tiglium* of botanical writers; the other he terms *C. Pavana*. Are both these species found in Ceylon? and if so, is Croton oil obtained from the seeds of both or of one only; and if from one only, from which? The Singalese name of Croton Tiglium is, according to Moon, *Jaya-pāla*. Is oil extracted from the seeds of any other species of Croton in Ceylon? Specimens of the seeds and of the plants which are known to yield them, are indispensable for settling any of the disputed points.

4. Is any use made of the seeds of *Jatropha Curcas*, the *Rata-endara* of the Singalese according to Moon? Is oil extracted from them in Ceylon? What use is made of it? Specimens of the plant in flower and in fruit; of the seeds; and of the oil procured in the island, are desired.

5. Is any resin collected in, and exported from, Ceylon, under the name of *Elemi?* If so, from what tree, and how is it collected? It is particularly desired to know, whether any resinous exudation is procured, for commercial purposes, from the following plants: 1. *Amyris Zeylanica*, called, in Ceylon, *Wæta-hik-gaha;* 2. *Amyris agallocha*, termed *Gugul;* 3. *Canarium balsamiferum*, denominated *Mala-kækuna*. Specimens of the resins obtained from these trees are highly desirable for examination and comparison with the resins met with in commerce under the name of *elemi*. They should be accompanied by flowering branches and with the fruits of the plants from which they are respectively obtained. Any information respecting the commercial uses of these resins is desirable.

6. Is the sago, which is stated by Bennett (*Ceylon, and its*

Capabilities, 1843), to be procured from the granulated pith of the talipat palm (*Corypha umbraculifera*), an article of commerce? Samples of it for examination and reference are desirable.

7. Authenticated specimens of the Tacamahaca obtained from the *Calophyllum inophyllum* are desirable, in order to assist Pharmacologists in determining, with accuracy, the origin of the tacamahaca of European commerce. Specimens of the flowering branches and fruit of the plant should also be sent.

8. *Ceylon Gamboge* is but little known to European Pharmacologists, very few persons having seen a sample of it. Specimens of it for reference, and notices of its uses and applications, are especially desirable. Its properties, both as a medicine and a pigment, require further examination. Is it obtained from more than one kind of plant? Specimens of the plant or plants, in flower and in fruit, should accompany the gum-resin.

9. To what circumstance is owing the red colour of much of the *Oil of Cinnamon* which arrives in Europe from Ceylon? Does it depend on the mode of obtaining the oil, on the kind of bark from which it is extracted, or on the age of the oil?

10. A collection of the indigenous plants of Ceylon, especially of those employed for medicinal and economical purposes, is highly desirable; and considering that at Paradenia there is a botanic garden, it is believed such a collection might be readily effected.

Resolved—That the thanks of the Committee be given to Dr. Pereira and Dr. Royle, and that their List of Queries be printed for circulation.

Dr. Pereira laid before the Committee specimens of French oil of turpentine, which he had received from Professor Guibourt, of Paris, and which he found to possess certain peculiarities in their optical properties, as compared with the oil of turpentine usually met with in this country. He stated, that this would form the subject of a paper to be read at a future meeting.

Dr. Pereira then communicated the following :—

NOTICES OF SOME RARE KINDS OF RHUBARB

WHICH HAVE RECENTLY APPEARED IN ENGLISH COMMERCE.

BY JONATHAN PEREIRA, M.D., F.R.S.

In laying before the scientific Committee of this Society some observations on several kinds of rhubarb, not frequently met with in English commerce, I take this opportunity of stating, that I am indebted for the specimens to Mr. Faber, who has on

this, as well as on several other occasions, very kindly aided my inquiries, in Pharmacological Natural History, by specimens and commercial information of an interesting and useful kind.

I propose this evening to draw the attention of the Committee to four kinds of rhubarb, which are respectively denominated *Canton stick rhubarb*, *Bucharian rhubarb*, *Siberian rhubarb*, and *Himalayan rhubarb*.

1. CANTON STICK RHUBARB.

Two kinds of rhubarb it is well known, are imported from Canton, the one called *China*, *East India*, or *half-trimmed rhubarb*; the other termed *trimmed*, *Dutch-trimmed*, or *entirely-trimmed rhubarb*.

I have recently met with a third sort, corresponding with neither of the kinds just alluded to, and which, on account of its resemblance to the English stick variety, I shall call *Canton stick rhubarb*. It is only recently that this sort has appeared in the market. Five cases of it were imported from Canton, and were sold during the last year by public sale, at eightpence per pound.

All the pieces but one of my sample, are cylindrical, about two inches long, from half to three-quarters of an inch in diameter, and weigh each on the average about 100 grains. The piece to which I have referred as forming the exception, is shaped like a flattened cylinder, cut obliquely at one end; its greatest length is about two and a half inches, its greatest breadth two inches and a quarter, while its depth is about one inch, and its weight is about two ounces. Mr. Faber, from whom I received it, tells me, that on the examination of a quantity of Canton stick rhubarb, he found several such pieces.

Most of the pieces are decorticated. These resemble English stick rhubarb in their texture and colour, except that they are, perhaps, somewhat paler. The taste is bitter, and somewhat astringent, but considerably less so than that of good, half-trimmed, Canton rhubarb. By chewing it, little or no grittiness is perceptible.

This kind of rhubarb is probably obtained from the root branches of the plant which yields the usual Canton rhubarb.

2. BUCHARIAN RHUBARB.

By most writers the term Bucharian rhubarb is employed synonymously with that of Russian rhubarb. But there has long been known in Russian commerce a rhubarb called Bucharian, which is not under the control of the crown, and which, on account of its cheapness, is used in veterinary medicine. Grassmann, an apothecary at St. Petersburg, considers it to be the

rhubarb which, according to Pallas, is obtained from *Rheum undulatum*, and which, in the *Pharmacopeia Rossica*, for 1798, was denominated *Radix Rharbarbi sibirici*.

I have received from Mr. Faber a sample of a rhubarb which was sent to him in 1840 by a first-rate drug-house at St. Petersburgh, under the name of *Bucharian rhubarb*, and which, he has been subsequently assured, is the genuine Bucharian kind. Some friends of his at Vienna have written to him respecting it as follows :—" We now very seldom see Bucharian rhubarb. It used formerly to be brought by Jews into Brody (Galicia) by the way of Russia, and the Jews of Brody used to supply Germans with it. But the quality being very inferior, and not better than European rhubarb, it did not probably answer."

This kind of rhubarb is intermediate, between the Chinese and Russian or Muscovite rhubarb, but is of inferior quality. The pieces are, more or less, rounded or flattened, and weigh from one to two ounces each. Some of them appear to have been deprived of their cortical portion by scraping, as in the Chinese rhubarb; but in others the cortex has been removed by slicing. Most of them are perforated by a hole apparently for the purpose of drying them ; but in none of the holes are there any remains of the cord used in suspending the roots. The holes, moreover, appear to have been cleaned out, as in the Russian rhubarb, for no portion of decayed rhubarb is seen in them. Some of the pieces are dense, but most of them are lighter than good Russian rhubarb. Internally, they are often decayed and dark coloured. Their texture is similar to that of genuine rhubarb. The odour also is like that of rhubarb, but much feebler ; the taste is bitter and astringent. When chewed, this rhubarb feels gritty under the teeth. Its colour is darker than that of good Russian rhubarb.

Altogether its resemblance is sufficiently great to the Russian rhubarb to induce me to believe that it, like the latter, is really the growth of the same part of Asia, and probably of the same plant. Calau, an Apothecary in the rhubarb factory at Kiachta, says, that the Russian merchants barter with the Bucharians for rhubarb in the custom-house at Kiachta, but that the selection of the crown rhubarb is conducted in a house appropriated for that purpose on the Chinese borders. Now, as all the rhubarb offered to the agents of the Russian crown must be burnt without remuneration, if not approved of, it is tolerably evident that the Bucharians will offer, for the most part, such kinds only as are likely to pass examination. The inferior sorts, therefore, must be got rid of by some other channels, namely, by private barter or sale. This is the origin, I suspect, of the Bucharian rhubarb which I have met with.

Grassman, in his account of the varieties of rhubarb found in

Russian commerce, describes Bucharian rhubarb as being darker than the ordinary kind. "It occurs" he says, "in heavy, roundish, knobby, perforated pieces, weighing seven or eight ounces each, of a more or less ochre yellow or brownish colour. Its texture is the same as that of genuine rhubarb, its odour strong, its taste bitterish, astringent, and at the same time mucilaginous; when chewed, it feels gritty under the teeth. The older pieces are often hollow and rotten internally. The younger pieces have the same shape as the true rhubarb, but they fetch only one-third the price of the Chinese root."

3. SIBERIAN RHUBARB.

Through the kindness of Mr. Faber, I have also received specimens of another kind of rhubarb, recently sent by another first-rate drug-house at St. Petersburgh to this country, under the name of *Bucharian rhubarb;* but it differs altogether in external appearance from the preceding sort. Three chests of it, the whole quantity imported, arrived in this country in January last, and were sold by public sale on the 27th of February, at sixpence per pound. It is believed that it was bought for exportation.

This rhubarb was packed in the same kind of chests as those in which the Russian rhubarb is usually imported.

I have reason to believe, however, that it is not Bucharian rhubarb; but is the root known in Russian commerce, as *Siberian rhubarb,* and is probably the rhubarb which Grassman calls *Siberian rhapontic root.* Mr. Faber tells me, that, on receiving it, he immediately wrote to the party at St. Petersburgh, who, in 1840, had sent, under the name of Bucharian rhubarb, to this country, the rhubarb which I have above described as Bucharian, and described to him the quality of these three chests. The answer was as follows:—"I have no doubt from your description, that those three chests are Siberian rhubarb, sent under another name for objects of secrecy."

Grassman describes what he terms *Siberian rhapontic root,* as being very readily distinguishable from genuine rhubarb. He says, that it occurs in long, thin, almost cylindrical or spindle-shaped pieces, which have been decorticated and perforated by a hole. Their colour, externally, is pale yellow, internally brownish yellow, or reddish white. Their odour and taste are those of rhubarb but weaker; and though bitter it has but little astringency. When chewed it does not feel gritty.

This description applies, in the main, to the rhubarb imported this year from St. Petersburgh as Bucharian, but which I shall describe as Siberian. In its general appearance it agrees with the rhubarb grown in this country, and known as English stick rhubarb. It has been decorticated, though imperfectly so,

as portions of the dark brown cortex are here and there left adherent. The pieces are all more or less cylindrical, seldom exceeding four inches in length and an inch in diameter, and on the average weigh about 100 grains each; the longest piece I have seen is six inches in length and an inch and a half in diameter. The broadest piece is somewhat flattened and about three inches in its broadest diameter. Its colour is in general darker than that of the ordinary rhubarb, but is of the same kind of tint. Its odour is remarkably sweet, similar to what I have perceived when drying the roots of different species of Rheum cultivated in England. When chewed it is not gritty. Its taste is mucilaginous, bitterish, but not astringent. The fracture of the smaller and sound pieces is similar to that of English stick rhubarb; the larger pieces are decayed, dark brown, rotten, and tasteless in the centre.

4. HIMALAYAN RHUBARB.

In November, 1840, when China rhubarb was very scarce and dear, nineteen chests of Himalayan rhubarb were imported from Calcutta into this country. The chests were of the usual Calcutta kind, made of the hard, heavy, brittle Bengal wood. The weight per chest was gross 1cwt. 2qrs. 26lbs.

Soon after their importation eight chests were bought and shipped to the Italian markets at 4*d.* per lb.; but finding there no buyers, the residue of the importation remained on hand until September last (though in the mean time the duty was reduced from 1*s.* to 3*d.* per lb.); when a sale for shipment to New York was forced at 1*d.* per lb., covering only part of the rent and nothing more.

Four Himalayan species of *Rheum* are mentioned by my friend Dr. Royle, in his *Illustrations of the Botany of the Himalayan Mountains*, namely *Rheum Emodi*, of Wallich; *R. Webbianum*, *R. spiciforme*, and *R. Moorcroftianum*. Dr. Royle states, that the Himalayan rhubarb, which makes its way into the plains of India, through Khalsee, Almora, and Butan, is probably, from its usual dark colour and spongy texture, the produce of either or both *R. Emodi* and *R. Webbianum;* the roots of *R. spiciforme* and *R. Moorcroftianum* being lighter coloured and more compact in structure.

In my *Elements of Materia Medica* I have described two varieties of Himalayan rhubarb which I have received, the one from Dr. Wallich, and probably the produce of *R. Emodi*; the other from Dr. Royle, who informed me that it was obtained from *R. Webbianum*. The former appears to me to agree best with the imported Himalayan rhubarb; indeed, one or two of

the pieces of the latter, strongly resemble the sample which I have received from Dr. Wallich.

I have reason to believe that the present is the first shipment of Himalayan rhubarb ever made to this country, and I suspect that the discouraging result will prevent, for the present at least, any further attempts to introduce it—its quality being very inferior, and unfitted for the English market.

The pieces of it vary considerably in size and shape; some are twisted, cylindrical, furrowed pieces, cut obliquely at the extremities, about four inches long, and an inch and a half in diameter. Others are circular disks, about three inches in diameter, two inches thick, and weighing about four ounces each. Besides these, semi-cylindrical, angular and other-shaped pieces are met with; and are obviously obtained by slicing the root. Some of the pieces are decorticated, while others are coated. The general colour is dark brown; the prominent decorticated and paler parts having an ochre brown tint. It has a feeble rhubarb odour, and a bitter astringent taste. When broken, it does not present the marbled texture characteristic of ordinary rhubarb. By chewing it, little or no grittiness is perceived. It is exceedingly light, and is rendered much more so than it probably is in its perfect form, by the porosity which it has acquired from being worm-eaten.

The Chairman said the Report, together with the accompanying papers, which had just been read, being the first fruits of the Committee appointed for carrying out some of the scientific objects of the Society, he might be allowed to remark that there was every reason to anticipate that much valuable matter, important both in a scientific and commercial point of view, would be elicited, as the Committee came into more active operation. As yet there had been only two meetings held; some time was necessarily occupied in completing the arrangements for carrying out their plans; and a still further lapse of time must occur before they could receive much of the information which they hoped to obtain from their foreign correspondents. He might state, however, that there were several subjects which had already been noticed in the Committee, which would, no doubt, be brought before the Society in a more matured form before long.

The following paper was then read :—

ON UNGUENTUM HYDRARGYRI NITRATIS.

BY MR. GEORGE FREDERICK SCHACHT.

The pharmaceutist, when about to prepare an article known to present certain difficulties in its manufacture, naturally refers to

scientific works for all the information he can obtain concerning it; and is frequently puzzled by finding not only many differences of opinion, but in some instances direct contradictions in the statements made.

This is remarkably the case wirh regard to the preparation of *unguentum hydrargyri nitratis*. For instance, it is stated that the formula given in the London Pharmacopœia will not afford a good ointment; it is said also that it will afford a good ointment in the quantity there ordered and in that only. Again, we find both these assertions contradicted.

The bad quàlity of the ointment, as frequently met with, is by one writer ascribed to the presence of common salt in the lard employed; by another to the influence of contaminating metals in the mercury, whose equivalents are lower than that of the latter; by another to the use of acid of lower specific gravity than that ordered in the London Pharmacopœia, or to the admixture of the fats and mercurial solution at too low a temperature.

The effervescence is said by some to be due to the liberation of nitric or nitrous oxide, and carbonic acid is stated to be one of the gaseous products.

The use of a much larger quantity of nitric acid than is ordered by the London College is by many recommended; and this alteration has been adopted in the Edinburgh Pharmacopœia; while others object to this as forming more strictly a nitric acid ointment.

The mercury is generally thought to be in the state of subnitrate mechanically diffused through the fats; a small quantity is stated to be in combination with the fatty acids.

The cause of the deterioration of the ointment by age is usually assigned to the deoxidizing power of the fat.

Such being the contrariety of opinions existing on the subject, it was thought advisable to institute a few experiments, of the principal of which the following is a detail. I am aware that some are not original, but these will serve as corroborations of previous assertions.

Experiment 1.—The process of the London Pharmacopœia was exactly followed and the quantities there ordered were used. Nitric acid, sp. gr. 1.5; the mercury quite pure; the lard well washed and freed from the water. The fats were mixed at a temperature of 180°, with the solution of mercury still warm. Effervescence immediately commenced; stirring was continued at intervals till the ointment set. The product was good.

Experiment 2.—One-sixteenth part of the Pharmacopœia quantities were used; the manipulation, the same as in No. 1, but the temperature 185°. The result, as good as in Exp. 1.

Experiment 3.—Twelve times the Pharmacopœia quantities were used; the temperature was 140°. The effervescence was very slight, but from the quantity of ingredients used, the cooling took place more slowly than in the preceding experiments, so that the prolonged continuance of the heat compensated for its lower amount. This ointment when cold was equal in appearance to the others.

Experiment 4.—The first experiment was repeated, but the lard was purposely contaminated with chloride of sodium; the result was equally good in appearance and consistency.

Experiment 5.—The first experiment was repeated, but the mercury was purposely contaminated with lead. The result was equally good.

Experiment 6.—The first experiment was repeated, but the acid used was of commercial strength, an equivalent quantity of course being employed in proportion to its state of dilution. A perfectly good ointment was produced.

Experiment 7.—The ingredients for the ointment were introduced into a retort, with a view to collect the gaseous products: an arrangement was made to condense the vapours of any liquids that might distil over at the same time, and the gases were of course to be collected over mercury. At the commencement of the experiment, a small quantity of mercury was displaced in the inverted jar. A liquid was condensed in the other part of the arrangement, which proved to be nitric acid, having the peculiar smell of the ointment. The gas collected gave no evidence of carbonic acid, nitric, or nitrous oxide, and appeared to be nothing more than the expanded air of the retort.

Experiment 8.—A portion of the best ointment treated with a large quantity of ether dissolved entirely. This experiment, repeated with samples possessing inferior external characters, deposited a yellow powder, perfectly insoluble in any quantity of ether, which, when examined, proved to be a nitrate of mercury. The ethereal solution gave evidence of mercury.

Experiment 9.—A portion of good ointment, placed in a retort fitted with a receiver, was heated until effervescence commenced; nitric acid distilled over, and the ointment gradually blackened and became hard.

Experiment 10.—A portion of ointment so blackened (Exp. 9) heated with a little nitric acid, and warmed so as to induce effervescence and drive off excess of acid, was restored to its original condition.

Experiment 11.—Experiment 10 was repeated with samples of old ointment, obtained at different establishments, which had become hard, discoloured, or pulverulent, some of which had been made by the Pharmacopœia process, and some by private

formulæ; two specimens had been made with butter; they were all restored to ointment of an average quality.

Experiment 12.—Two experiments were made in each of which the same quantities of ingredients were used, except that in the second was added a double quantity of nitric acid: the effervescence was continued in the latter case longer than in the former; the two ointments exactly resembled each other, and had the same weight.

From these experiments may be drawn the following conclusions:—

1st. The proportions of the ingredients ordered in the London Pharmacopœia for *unguentum hydrargyri nitratis* are good, and make a perfect ointment; and these proportions hold good in preparing larger and smaller quantities. (Exps. 1, 2, 3.)

2d. The cause of failure in preparing the ointment is not referable to impurities in the lard or mercury, or to the use of weak nitric acid. (Exps. 4, 5, 6.)

3d. The temperature at which the fats and solution of mercury should be mixed, depends upon the quantity of ingredients operated upon and the time the effervescence is continued; a short rapid effervescence being equivalent to a long slow one. (Exps. 1, 2, 3.)

4th. The effervescence of the mixture during the formation of the ointment is due principally to the disengagement of liquid nitric acid, which distils off accompanied by the peculiar smell of the ointment. (Exp. 7.)

5th. The mercury is in some combination with the fats, to which the presence of nitric acid is necessary. (Exps. 8, 9.)

6th. The ointment spoiled by age or accident during manufacture, may be restored to its original beauty. (Exps. 10, 11.)

7th. The use of excess of acid is no disadvantage, for if the heat be continued long enough it distils off. (Exp. 12.)

Further, the deterioration of the ointment from age (to which they are all liable) appears to depend rather upon the spontaneous evaporation of the nitric acid than upon the decomposition of the mercurial salt by the fat, which is represented to be caused by the affinity the latter substance has for oxygen. For if the fat had this great affinity for oxygen, is it not fair to suppose that it would at once appropriate it from the nitric acid which we have seen to be in excess? A specimen of the ointment has been placed in a tube and sealed hermetically, and it is expected will retain its beauty under these circumstances for an indefinite length of time, at present it is too soon to judge; with the permission of the Curator it shall be placed in the Museum beside another tube containing the same ointment, but which shall be

merely loosely covered, as an experiment to be determined by the lapse of time.

Laboratory, 17, Bloomsbury Square.

The Chairman said, as he had already noticed the previous papers as the first fruits of the Scientific Committee, he could not omit to express his satisfaction in receiving this as the first paper which had emanated from the practical school within their own walls. The author was a pupil in the practical department of the school, and he had no doubt that others of the pupils, as they progressed in their studies, and became capable of engaging in operations involving scientific research, would, from time to time, furnish papers to be read at those meetings. He thought the paper they had just heard was very creditable to the author, and although it did not enter much into the chemical points of the subject, it nevertheless contained matter of considerable practical value.

REPORT OF THE COMMITTEE

OF THE

MANCHESTER SCHOOL OF PHARMACY.

Read at the Annual Meeting of the Members of the Pharmaceutical Society, held in the Society's Rooms, Marsden Street, January 15th, 1845.

The time having arrived which completes your committee's term of office, they are glad on retiring to be able to congratulate you on the higher standing which the Pharmaceutical Society has now assigned to it by public opinion, than it had twelve months ago. This they think is evident from the manner in which the medical portion of the public press alludes to your rights, and to the qualifications needful for a due discharge of the duties of your calling.

Though, however, the General Society as a body has undoubtedly progressed, we cannot but deplore the indifference which, in this district, has been manifested to the advantages which this Society holds out. The rooms in which we now meet have been supplied with useful modern works on Chemistry, Materia Medica, Botany, &c.—the most valuable of the current scientific periodicals have been regularly placed on the table of the reading-room—a librarian has attended three evenings in each week from seven to ten o'clock, but still the attendance at the reading-room has been less numerous and regular than your committee anticipated. During the year two courses of lectures have been delivered by Mr. Leigh, one on General Chemistry and its application to Pharmacy; and the second, an evening

course, on Pneumatic Chemistry. These lectures have been attended by audiences averaging about thirty, many of whom have expressed themselves gratified with the varied and useful information possessed by Mr. Leigh, and his clear and unreserved communication of it. In now alluding to the future prospects of the Manchester Society, your committee would draw your attention to the announcement in the January number of the *Pharmaceutical Journal*—that it is proposed to reduce the annual subscription, and consequently to discontinue grants to the Provincial Schools. This measure will have the effect of throwing *your* school in Manchester upon its own resources, and upon the liberality of the members, and the desire for information evinced by the Associates in this neighbourhood. That it is important at the present time, when great changes are contemplated in the laws regulating the practice of medicine, that we should show ourselves alive to our real interests and true position as an inseparable branch of the medical profession will, we think, be admitted by all. Can we more effectually do so than by endeavouring to acquire, and to communicate to those whom we have undertaken to instruct, a competent knowledge of the principles upon which our calling ought to be conducted?

With this view your committee have recommended that the annual subscription to the *Manchester School of Pharmacy* be for Members, £1 1*s.*; and for Associates and Apprentices, 5*s.* This subscription to entitle them to the use of the reading-room, library, and to all lectures.

Resolved unanimously,—"That the Report now read be adopted, and that it be printed and circulated amongst the Druggists in this district."

Resolved unanimously,—"That the recommendation of the committee, fixing the annual subscription of the Members of the Manchester School of Pharmacy at 21*s.*, and of Associates at 5*s.*, be adopted."

Resolved unanimously,—"That the thanks of this meeting be conveyed to the Council of the Pharmaceutical Society, for their attention to our interests, and more particularly to Mr. Jacob Bell, for his unremitting energy in conducting the *Pharmaceutical Journal*."

THE TRIAL OF JOHN TAWELL,

FOR THE MURDER OF SARAH HART, WITH HYDROCYANIC ACID.

THIS is an important case in a medico-legal point of view. We believe it is the first instance in which a conviction has taken place, in this country, for poisoning by hydrocyanic acid; and as some portions of the evidence are at variance with the hitherto received opinions on this subject, as well as contradictory in some respects with other statements made by the witnesses, it is desirable that these points should be fully investigated, lest they should form precedents which might lead to fallacious results in other cases. There were a variety of incidents which contributed to form what appears to be a connected chain of circumstantial evidence against the prisoner; but these incidents, in order to be complete, required positive proof that the deceased died in consequence of the administration of hydrocyanic acid.

In order to give to the chemical evidence its due importance, we shall briefly notice the facts of the case, dwelling chiefly upon those particulars which relate to the toxicology of the question.

It appeared from the evidence, that the deceased was in good health at six o'clock on the evening of January 1st—that she expected her master (as she designated the prisoner) to pay her a visit that evening—and that after his arrival she went to a public-house to fetch a bottle of stout. Shortly afterwards, Mrs. Ashley, her next door neighbour, heard high words, followed by a kind of suppressed groan or shriek, which continued to be repeated for above a minute. She went out to ascertain the cause, and met the prisoner leaving the cottage. On entering the front parlour, she found the deceased on the floor in a disordered state, apparently insensible, and continuing to utter the same noise which had at first attracted her attention.

Mr. Champneys, a surgeon residing near the spot, was immediately sent for; but before he arrived, Mrs. Barritt, the landlady, came in, and attempted to pour water down the throat of the patient. Mr. Norblad of Slough attended in consultation on the 2d of January. Mr. Champneys deposed at the adjourned inquest, that he found the deceased on the floor with her head supported on a pillow. He fancied he felt two or three beats of the pulse, but was not certain. He then laid his hand on her heart, but felt no pulsation. After some minutes, he opened a vein in her arm, not with the idea of bringing her to life, but to ascertain the cause of death. He employed no other treatment. He smelt at the mouth to ascertain if he could detect any poison, *could recognize none*. He observed no sign of violence on the body. On a *post-mortem* examination the following day, assisted by Mr. Norblad and Mr. Pickering, he found the brain and heart perfectly healthy. The lungs, with the exception of an old adhesion, were *quite healthy*, as also were the abdominal viscera. He removed the stomach and contents, which latter were strongly acid. Oxalic acid was suspected, but on testing for that substance, it was not found to be present. Then the tests were applied for sulphuric acid, arsenic, and the various poisonous salts of lead and copper. LASTLY, it was suspected that prussic acid or a cyanide might

be present, and this suspicion was confirmed by subsequent experiments. Mr. Champneys thought the quantity in the stomach was sufficient to occasion death. He could not tell what quantity was present. He had never seen a person who had died from prussic acid. In answer to the question of a juryman whether the smell of prussic acid would not have been noticed if it had been present, Mr. Champneys replied, "It was very unusual not smelling the prussic acid, but I mentioned, during the examination, that I thought I smelled prussic acid; and Mr. Norblad did not think he did; and afterwards, on opening the stomach, I did not think I did at all." On cross-examination, Mr. Champneys stated that the adhesion in the lungs was of old standing. The lungs were perfectly healthy. The brain was quite healthy, and exhibited no remarkable appearance. He thought that prussic acid might make some difference in the appearance of the brain. Prussic acid having a very powerful smell in the free state, he suspected that it was in the form of a salt in the stomach of the deceased, but was not acquainted with the salts of prussic acid. He was of opinion that death had been caused by prussic acid in some form.

At the trial, Mr. Champneys stated, in addition to the above, that he had, in company with Mr. Norblad, taken the contents of the stomach on Friday, January 3d, to Mr. Cooper, of Blackfriars' Road, who had performed the analysis in their presence. Prussic acid had been obtained on two occasions before the adjourned inquest. He quoted two cases on record in which poisoning had occurred from prussic acid, and the usual smell was not observed. The first was Mertzdorff's case, quoted by Christison, of a boy who took three and a half drachms. On reference to Dr. Christison's work, it was stated that although the smell was not found in the blood it was strong in the stomach. The other case was that of seven epileptic patients in Paris, to whom $\frac{7}{10}$ths of a grain had been given by mistake, and in whose bodies Christison states no odour was perceptible. Devergie however, from whom Christison quotes the case, states, that although three physicians could not smell the poison, Orfila and Gay Lussac distinctly perceived it on examination eight days after death. Mr. Champneys had mixed half a drachm of Scheele's prussic acid in a tumbler of Guinness's stout, and the odour was scarcely perceptible. On removing the froth from the surface, he smelt it more distinctly. Mr. Champneys had been in practice four years, had never before examined, internally or externally, a human body after death by prussic acid. He had experimented on dogs and other animals. Supposing prussic acid to have been taken, he would decidedly have expected to smell it, knowing it to be an established fact that the body exhales a strong odour of it shortly after death. He smelt the mouth of deceased immediately after death, but there was no odour of prussic acid, nor was there any smell of it in the stomach. The contents of the stomach were very acid; being exposed to a heat of 212° Fahr., no smell was perceptible but that of porter and other food in process of digestion. There was no odour of the acid in the blood. The tests for prussic acid were not applied until after those for all the other poisons had failed; in cases of death from prussic acid the lungs are generally congested. The lungs of the deceased *were rather congested.* This is a symptom of sudden death from other causes. The right side of the heart contained fluid blood—the left side was empty; this might be expected in a case of congestion of the lungs. Witness did not examine the coronary arteries or the spinal marrow. The gall-bladder was of a natural red colour. He examined the trachæa and glottis, but not the bronchial tubes. In opening a vein he had no definite motive, but thought it better to try some of the means usual in such cases. Some persons are not susceptible of the odour of prussic acid. A person who has once smelt it would recognize it again. Witness was not aware that the colour of the

gall-bladder, in cases of poisoning by prussic acid, was blue, except on the authority of Taylor. The fluidity of the blood after death was a symptom of death by prussic acid, or any other sudden death.

Mr. Norblad deposed at the inquest that he had been called in on the morning of January 2d, and had examined the body. He confirmed the evidence of the last witness in many particulars. The brain, lungs, heart, abdominal viscera, and gall-bladder were perfectly healthy. He was of opinion that deceased had died from the effects of prussic acid, or some of its salts. From the absence of the usual odour and knowing that there is a salt which gives the same result by chemical analysis, he qualified his answer.

At the trial, Charlotte Howard deposed that, on a previous occasion, namely, the 30th of September, 1844, she was on a visit to the deceased, and in the evening the prisoner called. A bottle of porter was sent for, of which the deceased and the prisoner partook. Shortly afterwards the deceased complained of severe headache, was very sick, and during the night vomited at least a washhand basin full.

Mr. Norblad stated, that the above symptoms *resembled those which would be produced by an over-dose of prussic acid, short of what would prove fatal!!* Being asked whether the sickness might not proceed from a bilious attack, consequent upon overloading the stomach, and whether the quantity vomited would not favour this supposition, he replied, that the quantity ejected from the stomach bore no proportion to that taken in, as, in the event of the introduction of any irritant, fluids would be poured in from the secreting vessels, and thus increase the quantity to a great extent. —He had tried experiments with dogs, cats, &c. *but had never seen the effect of an over-dose of prussic acid on the human subject!* He had killed several dogs with prussic acid, and could not detect the odour after death. He considered his sense of smell acute, but could not smell prussic acid in the stomach of the deceased. The average dose of Scheele's prussic acid is five minims.* It is given to *allay irritation and sickness. He had never seen vomiting to occur after prussic acid!* The symptoms of an over-dose might be the same as those in case of death from sudden mental emotion, leaving no trace on the tissues of the body. There was *no congestion in the lungs* of the deceased. Death by prussic acid is preceded by an involuntary scream. Witness had never heard of a succession of screams being noticed in such cases. His first impression in the case of deceased was that oxalic acid was the cause of death, on account of the acidity of the stomach. On being asked whether blackness of the stomach was not the result of oxalic acid, he replied, Yes, and he had observed a little blackness in the stomach. He was of opinion that prussic acid was the cause of death.

Mr. Pickering's evidence resembled that of the other two medical witnesses. None of them noticed any dilatation of the pupils of the eyes, which is a striking symptom of death from prussic acid.

Mr. Cooper stated that, on the 3d of January, Messrs. Champneys and Norblad had brought to him the contents of the stomach, which he had, at their request, tested for oxalic acid, and the other poisons, already named; but found none, until at last he applied the test for prussic acid. For this purpose he placed a portion of the contents in a retort, with a little sulphuric acid, and distilled on a sand-bath. To this product he added caustic potash, sulphate of iron, and muriatic acid. The result was Prussian blue—an infallible test of prussic acid. This experiment was repeated with a water-bath with the same result. During these operations no smell of prussic acid was perceptible, the odour resembled that of ordinary food and porter partly digested. To a portion of the distilled liquor

* The usual dose in London is from a minim to two minims.—Ed.

nitrate of silver was added. A white precipitate was thrown down insoluble in cold nitric acid, but soluble in hot: proving that it was cyanide of silver. This precipitate being added to muriatic acid in a retort, the smell of prussic acid was observed on distillation. Finding some portions of apple in the stomach, and recollecting that the seeds of fruit of that tribe yielded prussic acid, Mr. Cooper treated the pips of fifteen apples with water acidulated with sulphuric acid and distilled. By the iron test he obtained Prussian blue, but not so deep in colour as that resulting from the former experiment. He did not observe any pips in the contents of the stomach. On the 8th of February, witness repeated the experiments with the remaining portion of the contents of the stomach with great care, for the purpose of ascertaining the *quantity* of prussic acid. He obtained from this operation 1.43 grain of cyanide of silver, equivalent to 0.27 grain of real prussic acid, and by calculation be estimated that the whole contents of the stomach must have contained at least half-a-grain, or 50 minims of the prussic acid of the London Pharmacopœia. Witness admitted that the elements of prussic acid exist in saliva, and a great variety of animal and vegetable substances. He thought it might exist in the stomach in a free state without being smelt, on account of the other substances with which it was mixed. He described the smell as being unlike other odours, but causing a peculiar sensation in the throat. He had no doubt of the existence of prussic acid in the stomach of deceased. Muriatic and acetic acids were present, therefore the prussic acid could not be in the form of cyanide of potassium.

Mr. Thomas, of Bishopsgate Street, chemist, deposed, that, on the 1st of January, he had sold to the prisoner two drachms of Scheele's prussic acid. The prisoner stated that he wanted it to use as an external application for a cutaneous affection of his legs consequent upon varicose veins. A prescription, written by Dr. Addison for the prisoner, was produced, which was as follows :—

℞ Aquæ destillat. } ℥iv.
Mistura Camphoræ āā } ℥iv.
Acid Hydrocyan. Scheele ℥j. M. fl. lotio.

Witness recognized the prescription. On the 2d of January the prisoner applied to him for two drachms more, stating that he had broken the other bottle by accident. Witness did not think it possible for a poisonous dose of prussic acid to exist in the stomach without its odour being perceptible. He had lately killed a parrot by inserting 30 drops in its mouth by means of a syringe. The odour was so powerful that two persons were obliged to leave the room, feeling a sense of suffocation. On adding 30 drops to 12 ounces of porter, the smell was very perceptible. Mr. Thomas had extracted from the pips of 15 small apples as much cyanogen as yielded 2.4 of cyanide of silver, equivalent to 0.48 of pure prussic acid. This experiment was conducted at the London Hospital, with the assistance of Dr. Letheby.

A piece of charred paper, apparently the cap of a bottle, which had been found in the fire-place at the house of deceased, was shown to Mr. Thomas. He stated that it could not be the cap of the bottle of prussic acid which he had sold to the prisoner, because that was not tied over with paper but leather. Three bottles had also been found in the parlour, but no inference could be drawn from them.

The remainder of the evidence related chiefly to the position of the deceased, in reference to the prisoner, who was the father of her two children; and it was suggested that the proposal to separate the children from her, and also to cut off the supplies of money, had occasioned a disagreement. It was alleged that the deceased had threatened to poison herself, but there was no proof that she had done so. The facts that the prisoner had in his possession the prussic acid—that he was the last person with her when

living—that he left her hastily in a dying state, and afterwards denied having been there, as well as his statement to the policeman that she had poisoned herself, created strong suspicion against him in the public mind. On the other hand, he declared that he was not aware that she was dying; and as it was natural that he should be desirous of maintaining secrecy respecting his acquaintance with her, the prevarication might be accounted for, though not extenuated.

From the above report it will be seen, that the medical witnesses had no practical experience in cases of poisoning with prussic acid—that they had got up their information on the subject from books and experiments on animals since the catastrophe, and that they endeavoured to shape their evidence so as to agree with the opinion they had expressed at the inquest, without deviating materially from the published authorities. By this means they contradicted themselves and each other on several material points, and thus, very much diminished the value of their evidence. The absence of the smell, and of the morbid appearances usually found after death from prussic acid, the presence of substances in the stomach capable of yielding it by decomposition, and the superficial manner in which the *post-mortem* examination was conducted, constitute the grounds on which a doubt has been entertained by some persons.

In considering this case, it is proper to divest the mind of the prejudice which some of the circumstances are calculated to raise against the prisoner. This prejudice has tended to throw the chemical and medical evidence in the shade, by creating a preponderance of opinion on the unfavourable side; but we contend that this branch of the evidence is entitled to unbiased investigation, as it might otherwise have undue weight in future cases, in which it might be quoted on insufficient grounds.

That prussic acid was obtained from the contents of the stomach cannot be denied: the evidence of Mr. Cooper on this point was too clear and conclusive to permit a doubt to be suggested.

But, it may be asked, was the quantity obtained sufficient to occasion death? From his experiments on a portion of the contents of the stomach, Mr. Cooper calculated that one grain of real acid, equal to fifty grains of the acid of the London Pharmacopœia, was procurable from the entire contents of the stomach. This quantity, it is believed, is amply sufficient to occasion death. On this point, however, we have a remark or two to make. Prussic acid kills by getting into the blood; consequently that portion of the acid which remains in the stomach is not the cause of death, but is the surplus or unabsorbed quantity. If, therefore, Sarah Hart died from poisoning by prussic acid, she must have swallowed at least one grain of real acid more than was sufficient to occasion death.

Admitting that prussic acid was procured from the contents of the stomach, the next point of inquiry is as to its origin? Now three possible sources present themselves:

1st. Prussic acid or a cyanide may have been swallowed by the deceased.
2d. Prussic acid or a cyanide may have been introduced into the stomach after death.
3d. Prussic acid may have been produced by chemical changes effected in the contents of the stomach.

Excluding from our consideration the second possible source of it, we shall confine our remarks to the first and third sources.

The absence of the smell of prussic acid in the body, as well as in the contents of the stomach, is an important fact bearing on this question. It was contended by the witnesses for the prosecution, that the odour was masked by the smell of the porter and of the contents of the stomach. For the prisoner it was contended, that the absence of the smell proved the

absence of the acid ; and that the acid procured by Mr. Cooper was produced by chemical changes effected in the contents of the stomach. The pips of fifteen apples, it was stated, yielded a quantity of cyanide of silver equal to nearly half a grain of real prussic acid, and it was proved that the deceased had had some apples given to her, and numerous portions of apple were found in the stomach.

Furthermore, bitter almonds and the sulphocyanide of potassium contained in the saliva were other substances from which, it was urged, the prussic acid might have been produced.

There is another point serving to illucidate this question : we refer to the symptoms manifested by the deceased. For the prosecution it was contended that the mode of death was that which usually attends prussic acid poisoning. On the other hand, it was contended by the counsel for the prisoner, that the deceased probably died from some other cause ; and in favour of this view it was urged, that some of the morbid appearances usually found after death from prussic acid were not observed—that the succession of screams, the prolonged interval before death, and some other circumstances, were inconsistent with the notion of death by prussic acid.

No attempt was made on the part of the prisoner to show that the deceased had poisoned herself.

The judge summed up with great ability, but unfavourably to the prisoner. He very skillfully analyzed the evidence ; but it was clear that he believed the prisoner guilty. The jury adopted the judge's view, and returned a verdict of *Guilty*.

DEATH AFTER WATER DIET FOR TEN DAYS.

On Friday, March 14th, an inquest was held on the body of Mr. H. Cordwell, of Tavistock Street, before Mr. Wakley, M.P. —The deceased had been attended by Dr. Curie, from 18th of February until a few days before his death. The diet at first prescribed was barley-water, grapes, and figs ; but on the 22d of February this nutriment was denied, and the patient was ordered to take nothing but cold water and a few minute powders at intervals. Dr. Curie, who is celebrated as a homœopathic physician, trusted to the powers of his system for the relief of the fever, which he stated to be the patient's disorder, and applying the principle to the diet as well as to the medicine, refused to allow even toast and water, lest the fever should be thereby increased. On Friday morning the patient was so weak that Dr. Curie ordered him to have some toast in his water, but he was not allowed to eat the toast. Dr. Curie afterwards ordered him a teaspoonful of beef-tea. By that time there was extensive hœmorrhage from the intestines, and blood exuded from the skin. On one occasion, a little arrow-root was given him by the nurse, but he ordered the basin to be concealed, lest the doctor should see it, as he was fearful of the result of transgressing orders.

On Sunday, March 9th, Dr. Roots and Mr. Headland were called in by a friend of the patient. They found him in an exceedingly emaciated condition ; the abdomen was so much drawn back towards the spine, as to present a concave aspect. He had

a piece of rag in his mouth which he chewed to allay thirst. There appeared to be no active disease except in the intestines. Dr. Roots ordered wine, brandy, chicken-broth, beef-tea, and arrow-root to be taken at proper intervals. At first the patient objected to comply, observing, that he had no opinion of medical gentlemen in general, and had implicit confidence in Dr. Curie. He said he had never seen a fever so wonderfully treated. When this prejudice was overcome the patient took the nourishment with avidity, but the exhaustion from loss of blood was so great that he did not rally. The hœmorrhage did not cease until Wednesday, shortly before his death. In consequence of various reports which had been circulated, Mr. Wakley instituted a minute enquiry into all the particulars, and the Jury returned the following verdict:—

"The jury are of opinion that Henry Cordwell died from exhaustion, caused by loss of blood from the intestinal canal, produced by natural disease ; and in complying with what the jury believe to be their bounden duty, in returning their verdict in strict accordance with the sworn evidence of the medical gentlemen who have been called as witnesses, the jury cannot refrain from expressing the strongest feelings of disgust and indignation at hearing it proved by the testimony of the nurses, that the afflicted gentleman had been cruelly exposed to a system of starvation, while in a state of the most extreme debility, during, at least, ten days previous to his death ; he having, during that long time, been allowed nothing but cold water, by the advice of his medical attendant."

POISONING BY PAREGORIC.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I send you by the same post as this letter, the *Bolton Chronicle*, wherein you will see an account of two inquests held in this borough, death ensuing from the negligence or ignorance of the parties from whom the articles were bought, who did not state the quantity to be used for a dose. It has caused a great sensation in the town, and the coroner has sent the evidence up to our Member, P. Ainsworth, Esq., to be forwarded to Sir James Graham, who has written down to say that Mr. Wakley is now preparing a bill to be brought into the House this session, to prevent even Druggists selling opiates. The coroner has also employed the police to go round the town and ascertain the number of small shops where drugs are sold, and they have found fifty-four ; but we have every reason to suppose there are many more. The Surgeons have also had a meeting, but I have not heard the result. Indeed, the encroachments made on our trade by these shops are so great, that it is now scarcely worth following. They keep all the articles of general

use, such as castor oil, salts, senna, opium, laudanum, paregoric, syrup of poppies, and a great many others. The prices of all they sell they reduce, and undersell the respectable Druggist. I called a meeting of the trade, who requested me to write to you, and ask what prospect we have of getting an Act of Parliament; and if so whether any clause will be introduced to prevent people selling drugs who have not served their time to the trade. Many propose we should be licenced every year, and pay such a sum that would be an obstacle to the opening of small shops; but if we obtain an Act, why not make the Membership of the Society a qualification? If you would ask the question through the Journal for each Secretary to send you up an account of the system that is carried on in each district, I am sure the London Chemists can form no idea of the nature of country business. In conclusion, allow me to return you the thanks of the trade for your attention to their interests, and believe me, Sir,

Yours respectfully,

GEO. LA FRENCH,

Bolton, March 15th, 1845. *Secretary.*

CHILDREN POISONED BY PAREGORIC.

On Monday, March 3, an inquest was held at Bolton, on the body of William O'Hara, an illegitimate child of seven months old. The child had been at nurse, at 4*s.* a week, with Rachael Turner, who had been in the habit of giving it "sleeping stuff," because it cried in the night. The child had been very costive. The paregoric was purchased at a provision shop in Black-horse Street, and the dose usually given was nearly a teaspoonful. Mr. Denham (Surgeon) who examined the body, stated, that the vessels of the brain were in a congested state, and a few drops of blood had escaped from one of the vessels on the left-side. The appearance of the intestines denoted death from opium. [?] James Hardacre (who had sold the paregoric) stated, that he was a mechanic, but keeps a baker's shop and sold drugs. He bought the paregoric of Mr. Green (Chemist), at 1*s.* 10*d.* a pound, and sold it at 4*d.* an ounce. He had mixed some himself, as follows: Camphor 30 grains, benzoic acid and opium, of each 36 grains, oil of aniseed 30 drops, proof-spirit a pint. He had lost his receipt and sent to Mr. Green for a copy. He gave no directions to customers respecting the dose. He was in the habit of selling opium, laudanum, corrosive sublimate, arsenic, and various other drugs. The mother of the child had previously had two illegitimate children, to which she had given paregoric, and they both died. Betty Entwistle, a witness in the case, acknowledged that she had lost three illegitimate children before they

were six months old. She had been in the habit of giving them paregoric.

The coroner severely reprimanded the mothers of the children, and committed Hardacre for trial.

On Wednesday another inquest was held before the coroner on the body of a child, son of William Clement, about a month old. The mother stated, that on Sunday night she had sent for a pennyworth of "stuff for the child," and was directed to give it a teaspoonful. She gave half a teaspoonful. The child fell asleep at eleven o'clock, and did not wake until noon the next day. At ten on Monday night she gave another dose, and on Tuesday afternoon the child died. Sarah Barlow, a spinner, stated, that she sold cakes. On Sunday evening a boy came to her for some stuff for a child. She took a pennyworth of opium, a pennyworth of treacle, and a gill of water, which ingredients she boiled together for the usual mixture. She was in the habit of selling it for children, but not to any great extent. The jury returned a verdict that "The deceased died from an over-dose of opium, administered by its mother, without knowing the effect it would produce."

At the conclusion of the case, the jury handed to the coroner the following declaration in writing:—"That it is the opinion of this jury that the practice of dispensing drugs by persons who are ignorant of their uses and effects, has been attended with a great deal of injury and even loss of life within this borough, particularly in opiates, which are so frequently administered to children; and although, in the present instance, the evidence would not warrant us in placing any person upon trial, yet we strongly suspect that the use of paregoric has been the cause of the child's death. We are also quite convinced that William Clement, who has had opium administered to him in ignorance of its nature and effect, has met his death in consequence."

DAMAGES RECOVERED FOR THE SALE OF ADULTERATED TRAIN OIL.

Northern Circuit.—On 10th of March an action was brought by Mr. Broughton, a farmer residing near Doncaster, against Mr. Atkinson, Druggist, for selling to him, for and as train oil, to be administered to his cattle, a deleterious mixture, by which they were poisoned. In September last, the plaintiff sent his servant for a gallon of train oil, and the next morning a quantity of it was administered to some calves, in doses of about a gill. Within a few minutes they were seized with great pain, foamed at the mouth, and within a quarter of an hour two of them were dead. Eight others, after much suffering, partially recovered, but were permanently damaged in value. The intestines were found, on examination after death, to be in an inflamed state. The remainder of the oil was analyzed by Mr.

West, of Leeds, who reported that it was not train oil, but a compound oil, lately introduced under the name of "pine" or "vegetable oil. It is composed of a variety of ingredients, among which are naphtha and fish oil, and its acrid properties were sufficient to account for the death of the calves. A verdict was returned for the plaintiff—damages £25.

A PRUDENT PRECAUTION.

On Monday, the 10th of March, Mr. Samuel Dumbell, who was lately in the service of Messrs. Maclure and Co., lithographers, of Castle-street, Liverpool, applied to Mr. Smith, Druggist, 35, Great Homer-street, for some prussic acid. Mr. Smith enquired for what purpose he wanted it, and was told that it was for a new process connected with lithography. The explanation not being satisfactory, Mr. Smith proposed to send it instead of allowing the applicant to take it with him, and filled a bottle with a weak solution of tartaric acid, which he labelled hydrocyanic acid, suspecting that it was wanted for an improper purpose. On Friday, a messenger was sent in haste to Mr. Smith to say, that the poison had been swallowed, and to obtain from him some antidote. All parties were much relieved when Mr. Smith informed them, that the supposed poison was nothing more than a little acidulated water.

A STRONG DOSE.

The following prescription was prepared for a patient a few days ago. His wife, in a passion, drank a wineglassful and half of it. She soon became very sleepy and complained of headache. The next morning she sent to the Chemist for two pills as an antidote. He referred her to a medical man. We have not heard the result :—

℞ Liq. Potassæ ℥ij.
Potasii Iodidi ℥iij.
Liq. Potas. Arsenitis, ℥ss.
Tinct. Hyoseyami ℥ss.
Tinct. Sennæ. Co. ℥j.
Aquæ Pimentæ ℥iij.
Capiat. Cochl. j. min. ter. die.

OBITUARY.

PROFESSOR DANIELL.

The sudden and lamented decease of Professor Daniell occurred on the 14th of March. The professor delivered his usual lecture on that day between three and four o'clock, but concluded it at a few minutes before four in order to attend a meeting of the Council of the Royal Society. During a discussion, in which he took an active part, he sat down, and was observed to lean back in his chair. In a few minutes he had ceased to breathe. A vein was immediately opened, but life was extinct.

On a *post-mortem* examination nothing was discovered which could account for death.

The facts connected with this melancholy event show how needful it is to be cautious in coming to a positive decision in cases in which it is suspected that death has occurred from poisoning.

ORIGINAL AND EXTRACTED ARTICLES.

LUFFA PURGANS AND LUFFA DRASTICA.

South American Colocynth.

In a recent number of the *Pharmaceutical Journal* (February, 1845) is a notice, by Dr. Scott Alison, of a cucurbitaceous fruit employed by the natives of Brazil.

Some ten or dozen years since Dr. Pereira received specimens of the same fruit from the Brazils under the name of *South American Colocynth.* The fruit was sent to this country with a view to its introduction as a substitute for the true colocynth (*Cucumis Colocynthis*).

It is an undescribed species of *Luffa*, called by Von Martius *Luffa purgans.* The following notice of it, as well as of another Brazilian species of *Luffa*, is taken from Von Martius's *Systema Materiæ Medicæ Vegetabilis Braziliensis.*

1. *Luffa purgans* Mart. Pl. med. et oec. Bras. med. t. 68. *Buchinha.*

Extract of the fruit substituted for colocynth, especially in dropsy and chronic ophthalmia. In the dose of three grains it produces catharsis, and in a larger dose acts powerfully on the bowels. Mart. Reise II. 546, n. 14, under the name of *Momordica purgans.*

The following species is employed for the same purposes:

2. *Luffa drastica* Mart. *Momordica Luffa.* Vell. x., t. 93.

CLOVE BARK.

The term *clove bark* has been applied to the barks of two different trees belonging to the natural order *Laurineæ.*

1. One of these barks is frequently called *Culilawan bark.* It consists of almost flat pieces, and is obtained from *Cinnamomum Culilawan*, a tree growing in Amboyna, and probably other parts of the Moluccas.

2. The other bark, known as *clove bark*, occurs in quills which are imported from South America. Murray in his *Apparatus Medicaminum* (vol. iii., p. 314, 1784) calls it *cortex cassiæ carophyllatæ*, and says it is produced by the *Myrtus caryophyllata*, a tree termed by De Candolle (*Prodromus*, vol. iii., p. 260) *Syzygium caryophyllæum.* It appears, however, that this is an error, for both Nees (*Syst. Laurin.*) and Von Martius (*Systema Materiæ Medicæ Vegetab. Braziliensis*, 1843) declare it to be the produce of *Dicypellium caryophyllatum*; and the last quoted authority states that this tree is the noblest of all the laurels found in the Brazils, where it is called *Paó Cravo.* It grows at Para and Rio Negro.

ON THE PUBLICATION OF FORMULÆ.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As a member of your society of four years standing, I claim the liberty of expressing a little jealousy of the commendation which you give in your Notice to Correspondents in your number for this month (March) p. 435, to "Mr. May," who fears lest "undue advantage" should be given "to the idle and ignorant" by the publication of formulæ for various compounds; in fact, your correspondent's argument appears to be—"Sir, you know that by this craft, we have our wealth," and it brings "no small gain unto the craftsmen."

Mr. Editor, I have been connected with the business of a Chemist and Druggist more than twenty years, in London, in several provincial towns, and in America; and I have seen a great deal too much of this spirit of secrecy, "*arcana fœtida;*" and I know it as a fact, that there are Druggists who are so ignorant as to suppose that the Pharmacopœia, and prescriptions generally, are written by physicians in Latin, not because Latin is the language understood by the learned throughout the world, but for secrecy. I know that one object for using the Latin language was, that the prescription might not be made up by the ignorant; but, alas! how has that intention failed.

Mr. Editor, I do not recollect any formulæ given in your Journal, of which your correspondent need fear the publication, for, I presume, that "Gray's Supplement," and other similar works, are equally open "to the idle and ignorant;" and if the *Pharmaceutical Journal* has improved upon formulæ, given in former works, surely, this is for the benefit of the public. But, how deplorably low must be that trade or profession which can be seriously injured by knowledge obtained from a book by the idle!

I hail the Pharmaceutical Society as likely, in some measure, to disperse this mist; but it will ever be the glory of the quack, that the most conscientious and well-informed cannot undertake to state the exact composition of his pill and mixtures; whilst the regular physician despises and justly condemns his nostrum.

Let every possible formula be published, and the *honest* Chemist and Druggist cannot be injured; for it will never suit the public, much less "the idle and the ignorant," to keep a stock of the innumerable items of a Druggist's shop; nor will any formula be of use to him, whose shop consists of "a beggarly account of empty boxes," "green earthen pots," &c. "thinly scattered to make up a show."

I hope that your Journal may be to the trade like Diogenes' lantern, held up in the dark to find the honest man and to confound the quack.

I am, Sir, your obedient Servant,

JOSEPH LEAY.

137, *Broad Street, Birmingham, March* 4, 1845.

SUPPOSED DISCOVERY OF A NEW ALKALOID IN CINCHONA BARK (CHINIDINE).

BY F. L. WINCKLER.

(An Epistolatory Communication.)

I TOLD you on a former occasion, that I suspected the presence of a new alkaloid in a specimen of cinchona bark which I had purchased as yellow bark, and have since discovered, in addition to quinia and cinchonia, a third alkaloid, which I described in a former paper, and considered identical with *cusconine*. I then obtained it in too small a quantity for examination. I have lately purchased a quantity of quinine which contains at least one-third of this new alkaloid, and a few days ago I saw at M. Merk's a specimen of quinine which contains but little pure quinia, and may be considered a sulphate of the new alkaloid. Thus I have been enabled to test it to ascertain its proportions, and subject it to elementary analysis, which I will communicate at a future period. The chief distinction between this new alkaloid and quinine, consists in the *insolubility* of the former in *cold ether*, the difference from cinchonia is marked by the different form of the crystal, and salts of the new alkaloid, and by the acid sulphates forming with water a more deeply blue solution than that of sulphate of quinia, the crystals likewise effloresce more rapidly in the air. The neutral sulphate is distinguished from the corresponding salt of quinine by its remarkably white colour, and a *peculiar faint lustre*. The new alkaloid is more soluble in spirit than cinchonia, but less so than quinia. From a concentrated alcoholic solution, it crystallizes readily in form of fine prisms, similar to those of sulphate of quinine, but from a more dilute solution in very fine reticulated silky columns, which, joining, form stalked clusters in smaller or larger groups. A bark containing a large quantity of this alkaloid has evidently been used in the manufactories where quinine is made, the only question would be whether its action is the same as that of quinine ?

I have for the present given it the name of *chinidine*, from its resemblance to quinine.

Postscript.—Although an analysis of a double salt of chinidine with chloride of platinum gave a very different result from a corresponding double salt of quinine, the existence of the former was rendered rather doubtful subsequently. Merk and Zimmer merely found that the alkaloid insoluble in ether is only a basic sulphate, which, in the decomposition of sulphate of quinine by means of soda and ammonia, remains undecomposed, because surrounded by quinine. Unto the present time, I always decomposed the acid salt in the preparation of pure quinine, by an excess of ammonia, and never found that the hydrate thus separated when dissolved in ether left a residue, and am at a loss with Merk to explain this anomaly. I have however convinced myself that the supposed new alkaloid dissolved in dilute muriatic acid yields, with chloride of barium, decided traces of sulphuric acid, but dissolves with ether and solution of ammonia into two perfectly clear layers. But as my experiments are not concluded, I wish to prevent all misunderstanding and objections. — *Buchner's Repertorium für die Pharmacie*, Band lxxxviii., page 392.

ON THE PRESENCE OF PIECES OF COBALT* IN SAMPLES OF ANTIMONY.

BY KALLHOFERT.

A FEW days ago, whilst weighing and sorting a specimen of crude antimony, I detected the presence of cobalt. Although this is a rare occurrence, and probably arises from the carelessness and neglect of the vendor, I think it worthy of being mentioned, because it shows how very necessary it is to subject all goods received from wholesale Druggists to a careful (or even a chemical) examination; for we sometimes meet with very dangerous admixtures among the very best samples received from the most trustworthy persons, as this case proves.

ON A NEW METHOD OF MAKING MEDICATED TINCTURES.

BY HENRY BURTON, M.D.
Physician to St. Thomas's Hospital.

[*From the Medical Gazette.*]

HAVING lately been engaged in examining the strength and properties of the officinal tinctures, I am induced, by the results of my experiments, to notice several objections to the common method of making tinctures by maceration, as directed in the London Pharmacopœia, and to suggest a modification in it which seems to offer advantages not only over the old method, but likewise over the more recent French method of percolation, as recommended in the Edinburgh Pharmacopœia.

Against the common process of maceration one of the chief objections consists in the difficulty of shaking or stirring effectually the large quantity of materials which are usually employed at one operation in pharmaceutical laboratories; another is the length of time which the process occupies; and a third imperfection is, the waste of spirit by evaporation during the act of stirring, and the final transfer of the moist materials from the macerating vessel to the filter, through which the turbid tincture must be eventually passed.

In order to obviate the imperfections alluded to, and to exhaust the solid, or deprive it of its soluble components, with less labour and in a shorter period than is practicable by the method commonly pursued, I suggest that the two parts of the process, namely, maceration and filtration, which are now performed separately, should be conducted simultaneously, and the solids packed beforehand in the bag which is afterwards to serve as a filter. The process is recommended by its simplicity, and may be readily accomplished by suspending the bag of solids just under the surface of the solvent, so that all parts of the bag be immersed, and a space left between its lowermost end and the bottom of the macerating vessel.

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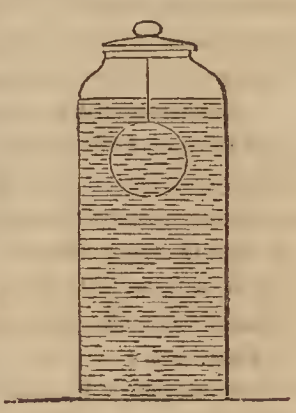
* What the author here terms cobalt, is probably neither the metal nor one of its ores, but sublimed metallic arsenic, as it occurs in commerce, covered by a black suboxide, and known by the name of "*flystone*," for this product is called in vulgar parlance *cobalt*. The erroneous name it has probably derived from the circumstance of arsenic, *viz.* arsenious acid, being chiefly obtained from the ores of cobalt. An adulteration of the crude sulphuret of antimony with black arsenic is very singular, and not at all improbable, although the adulteration was probably not effected purposely, any more than that of the bitartrate of potash with arsenious acid—a case of poisoning by which came before the public a few years ago, when it was proved that in the shop where the cream of tartar was sold, the arsenic was kept in a drawer immediately above it, and had thus fallen through.—(*The Editor of the Repertorium.*)—*Repertorium für die Pharmacie*, Band xxxvi. Heft. 1.

In this process no shaking or stirring is requisite; it may be said to be automatic; and as soon as the spirit begins to act on the solid, a coloured tincture will be seen to gravitate through the colourless and lighter spirit by which it is surrounded. In proportion to the rapidity with which the heavier tincture gravitates, a corresponding bulk of lighter spirit ascends, and is carried or forced into contact with the solid suspended at its surface. Thus, in a short time, a descending and ascending current will be established throughout the fluid, and will continue to move as long as the solid contains any soluble extract, or the solvent has become saturated, and incapable of dissolving an additional quantity.

One of the best illustrations of this process is afforded by the phenomena which may be observed during the making of tinctura kino, with the proportion of ingredients directed in the London Pharmacopœia; a brief description of which will serve as an explanation of this new application of a principle long familiar to scientific chemists.

Take for example, 126 grains of kino, in small fragments or coarse powder, and inclose them loosely in a calico bag, large enough to contain as much again, and secure the mouth of it with a fine string. Next choose a glass bottle, stoppered, with a wide mouth capable of holding four fluid ounces of spirit, and pour into it three fluid ounces of spiritus rectificatus, having a specific gravity of 0.838 at 60°. Then suspend the bag of kino by its string, attached to the neck of the bottle, just below the surface of the spirit, and close the bottle, as represented in the annexed sketch No. 1.



The bottle should be left at rest, and almost as soon as the kino is immersed its dissolution commences; in proof of which a bright red stream of tincture begins to descend, and for a short time remains at the bottom of the bottle, distinct from the colourless spirit above and around it; but in the course of a few hours the red stratum will have increased in thickness, and eventually ascend to the upper surface.

The tincture of kino thus produced will be perfectly clear, and its physical properties at the end of three or four days will correspond precisely with a tincture made with kino of the same quality, and spirit of equal density, mixed in the same proportions, and macerated together in a bottle for the space of fourteen days, according to the old method.

Equal quantities of the same kind of myrrh, treated respectively, with rectified spirit of equal density, by the two processes, yielded two tinctures which also possessed analogous qualities; and the tincture made by the new method was perfected in three days. The tinctures of jalap and opium were likewise perfected in about the same period, and that of catechu in two days. Those of yellow and pale cinchona, and that of compound gentian, have also been prepared with great facility by the same method.

But as the solubility, in the same kind of menstruum, of the animal and vegetable compounds used in making the officinal tinctures, varies with their nature as well as with the temperature of the neighbouring air, heat promoting, and cold on the other hand retarding it, and as no advantage is invariably gained by shortening the process of maceration a few days, but, on the contrary, some risk might be incurred of failing to exhaust the solid, it will be safer to protract the maceration by supension of large quantities to seven days, although a less time might serve in many cases.

The subdivision of the solid will also influence the rate of its dissolution; and in general fine powders are more quickly acted on by menstrua than coarse powders; but for some reasons the latter are preferable, and the directions given in the London Pharmacopœia, as to the disintegration of the solids used in making tinctures, are sufficiently explicit.

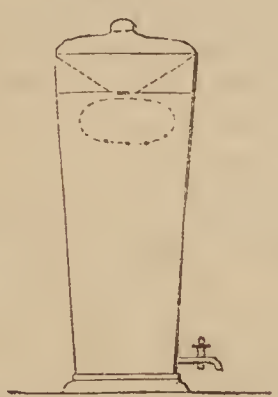
The absorbing power of dry porous solids, and the reciprocal affinities

between them and spirit, are able to overcome considerable impediments to the free circulation of the latter through the bag and its contents; but unless attention is paid to the texture of the bag, and the mode of packing it, time will be lost, and the perfect success of the method endangered.

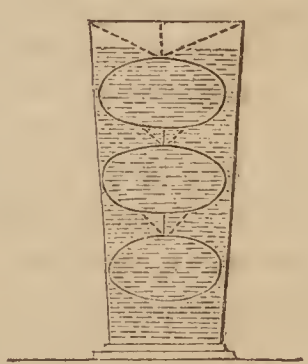
Fine flannel or calico will answer the purpose of a filtering bag very well; and in this the dry solids should be loosely packed, so as to allow space enough for their expansion on being immersed in the spirit, and for the circulation of the latter through them.

But some solids, as cinchona, used in making tinctures, are more bulky than others, as kino, and the proportions of spirit are definitely fixed by the directions given in the London Pharmacopœia; and it will be found in consequence, that when a very bulky substance is to be macerated by suspension, that the quantity of spirit will not be sufficient to cover the bag and solid in a vessel of the cylindrical form. In such cases it will be necessary to choose a vessel of the requisite capacity, and of a conical shape, inverted and truncated, as delineated in the annexed drawings, Nos. 2 and 3. It may be constructed of either porcelain, earthenware, or glass, furnished with a lid to fit closely, and with a tap at its bottom through which the spirit may be drawn off.

No. 2.



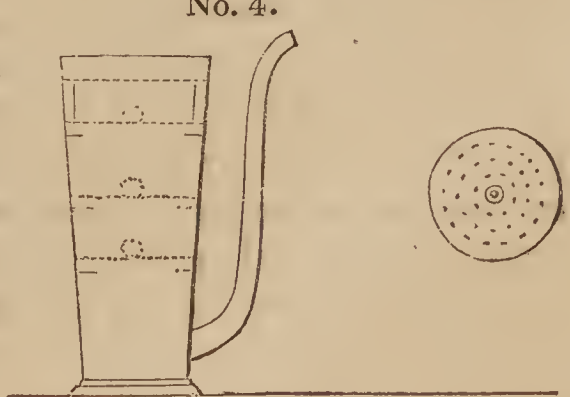
No. 3.



In this shaped vessel, from the capacity of a champagne glass to that of a jar containing many gallons, the macerating bag of proportionate dimensions may be suspended at the requisite height by regulating the length of the strings, either fastened to the outer rim of the vessel, or to projections made on purpose within it; and so arranged as to keep the bag just clear of the sides, and as high as possible above the bottom of the vessel, but at the same time under the surface of the spirit.

The quantity of tincture which can be decanted or drawn off after the maceration has been completed is always rather less than the original quantity; and when porous solids are used, the loss of spirit may be obviated in part by submitting the bag to pressure; but a portion will be permanently retained by the solids, and the expressed tincture will be turbid. When, therefore, the loss of a small proportion of spirit is not an object with the pharmaceutist, the solid may be more effectually exhausted, and a clear tincture obtained, by submitting the bag and its contents to a second maceration in a fresh portion of spirit, equal in bulk to that which is retained by the solid after the first maceration.

No. 4.



But if no pressure is thought to be requisite, less spirit would be wasted by absorption, and time saved, by modifying the arrangement, and substituting a fine sieve-shaped receptacle for the bag, suspended at the proper height, as before described, or by internal projections, and in which the solids may be loosely strewed, as in the annexed outline sketch, No. 4.

I have found this arrangement answer very well with catechu and myrrh; and it has the advantage of exposing a more extensive surface to the action of the solvent, and retaining a less quantity of spirit by absorption, than when the bag is employed.

The foregoing remarks relative to making tinctures apply also to the medicated wines of the London Pharmacopœia; and I have prepared by this process the vinum ipecacuanhæ in less than forty hours, and the vinum colchici in three or four days, of equal strength respectively to those made by the old process in fourteen days. The same plan may be followed in making infusions; but the macerating bag should be open as the coffee-biggin, and the boiling water poured on the solids to be infused, in a vessel somewhat resembling the sketch No. 4, having a spout through which the infusion may be poured when cold.

Mr. Warington, of Apothecaries' Hall, has kindly lent his valuable assistance in trying the proposed method on a large scale; and I am also indebted to Mr. Whitfield, the Apothecary of St. Thomas's Hospital, for several useful practical suggestions; the testimony of both of these gentlemen tends to strengthen my own opinion of its general applicability to the purposes of pharmacy, and of its novelty.

Jermyn Street, Aug. 1844.

[The principle upon which this process is founded is not a recent discovery. It was pointed out by Mr. Alsop, several years ago, in reference to infusions (see vol. i., page 57). Mr. Alsop proposes to lay the ingredients on a perforated diaphragm or plate, rather above the middle of the jar, observing that, "during the maceration, the contiguous fluid becomes charged with soluble matter, sinks through the perforations, and unsaturated water supplies its place, as long as anything further remains which water has the power of dissolving."

For some tinctures we think the process of Dr. Burton an improvement upon the plan of maceration in the old way. It would not, however, be applicable to tincture of hops, or any other tincture in which the ingredients are so bulky as nearly to fill the vessel to the top. In many respects the process of displacement is still more advantageous where it can be adopted. With the apparatus introduced by Mr. Gilbertson, very little evaporation takes place, and the whole of the tincture is obtained from the dregs by proper management. In most cases, favourable to the adoption of Dr. Burton's process, displacement would answer quite as well, with greater expedition and economy. In practice the most convenient process *for general use* is the old plan of macerating in a stone bottle or earthenware barrel, and shaking it three or four times a day. This requires no particular tact or nicety of manipulation. It is only needful to keep the bung tight, shake frequently, and press the dregs well. The other processes are more or less advantageous, according to circumstances; among the most important of which is the skill and experience of the operator, without which either of them may be less uniform and satisfactory than the old method.—Ed].

ON THE PORTION OF OPIUM WHICH IS INSOLUBLE IN COLD WATER.

BY STANISLAUS MARTIN.

It is a very general opinion that water extracts all the active constituents from opium; but M. Martin has observed that the residue of opium, which is insoluble in water, if subjected with sugar and yeast to fermentation, will yield still a very narcotic preparation. He found in the residue remaining in the preparation of the aqueous extract of opium, and of the acetate and muriate of morphia, *brown extractive matter*, *narcotine*, *fatty oil*, *resin*, *caoutchouc*, *bassorine*, with *a gum-like substance*, *sulphate of lime*, *&c.*, with *vegetable fibre*. One part of this residue of opium, which is insoluble in cold water, was mixed with 175 parts of sugar and 40 parts of yeast, and exposed to a temperature of 77° Fahr. When fermentation had ceased, and the fluid had become clear, it was filtered and evaporated in a water-bath to dryness. The extract was again dissolved in water, and subjected with sugar and yeast again to fermentation, then refiltered and evaporated. *This fermented extract of opium* is of a brown colour, and has a peculiar aromatic odour and bitter taste, producing a sensation of warmth on the palate. Two centigrammes of this extract produced narcotism with head-ache in a strong man, and in a second experiment vomiting ensued. A dog of moderate size was killed by one gramme = 16 grains. This subject is worthy of further examination.—*Repertorium für die Pharmacie*, Band xxxvi., Heft 1.

ON COCHINEAL.

BY M. LETELLIER, OF ROUEN.

There are two varieties of cochineal met with in commerce, the grey and the black, and authors do not agree as to the cause of this difference. Some think it is due to the different methods employed to kill the insects, while others attribute it to some variation in their culture. M. Fée, in his *Cours d'Histoire Naturelle Pharmaceutique*; M. Bussy, in his *Traité des Falsifications des Drogues Simples*; and M. Boutron Charlard, in a note, published in the second volume of the *Journal de Pharmacie*, all express the same opinion—that both the grey and the black cochineal are originally the same species of insect, but that the difference in their appearance, as met with in commerce, arises from the circumstance that the insect furnishing the black cochineal is killed by plunging it in boiling water, which deprives it of the white hairs with which it is naturally covered; while the grey cochineal, being killed by exposing it to the heat of a furnace, retains its natural colour. On the other hand, M. Guibourt thinks, that the black cochineal is a variety produced by culture, and further removed from the wild state than the grey. According to this author, the black variety is more rich in colouring matter, and more esteemed than the grey. In confirmation of this statement, he says, there are persons employed at Bordeaux in converting grey cochineal into black, by a particular process, for which they charge fifty centimes per pound. He also says, as well as M. Bussy, that if talc and cerusse be added to cochineal, it is not to the black kind but to the grey, and merely for the purpose of increasing the weight. According to M. Fée, the grey cochineal is more esteemed than the black, because, he says, the latter has lost a portion of its colouring matter by its immersion in boiling water, at the time of its collection. M. Boutron Charlard, again, thinks that both varieties are equal in quality; but, contrary to the statement of Guibourt, he says, the black cochineal is artificially changed to grey, *because the latter is the most esteemed.*

It appears from all these opposite opinions that the quality of cochineal cannot be estimated by the physical characters alluded to, but that recourse must be had to comparative trials of the specimens. Messrs. Robiquet and Anthon have given two methods of determining the quality of cochineal, according to the quantity of carmine it contains.

Robiquet's process consists in decolourizing equal volumes of decoctions of different cochineals by means of chlorine. The quantity of the cochineal is estimated by the amount of chlorine required to decolourize the decoction on shaking them together in a graduated tube.

Anthon's process is founded on the property which hydrate of alumina possesses of precipitating the colouring matter from decoctions of cochineal, so as to leave the solutions entirely colourless.

The first process, however, good as it may be in the hands of an experienced chemist, appears not to be well adapted for manufacturers; and, further, it is difficult to obtain solutions always identical, or to preserve them without alteration when obtained. Thus, the solution of chlorine, when exposed to light, undergoes a change, resulting in the formation of a compound, the action of which would be different from that of the original solution. The second process appears to me to be preferable to the other, inasmuch as the test liquor may be kept for some time without undergoing change. This is used with a graduated tube, each division representing the one-hundredth part of the colouring matter present. In my investigations, I have not had recourse to any chemical agents, as MM. Robiquet and Anthon have; nor had I any prospect of finding out any better or more simple process than they employed. I adopted nearly the same method of investigation as that pursued by M. Girardin with reference to annatto. In a word, I estimated the qualities of the cochineals of commerce by comparing the depth of colour produced by them. This appeared to me the best method, as it enables the consumer to judge of the quality of cochineal with as much facility as the chemist.

As already stated, there are in commerce two kinds of cochineal, the grey and the black. The grey cochineal may be divided into two distinct varieties; the first is plump, heavy, and regular, having the eleven rings, of which the animal is formed, quite distinct. The convex form of the insect on one side, and its concave form on the other side, are preserved. Its grey colour is found to be due to white hairs with which it was covered during its growth. The second variety is irregular, and altogether shapeless. The white covering exists in such great quantity in the concavities and between the rings of the insect, that it appears in the form of small round masses, among which the rings, so well defined in the first variety, can here with difficulty be traced. This cochineal is generally heavier than the other, and it almost always contains sand and some metallic powder, besides the talc in which it has been rolled, which greatly add to the weight.

The black cochineal does not present any well marked characters; sometimes it is, like the first variety of the grey, heavy, concave on one side, and convex on the other; at other times it is quite irregular, small, wrinkled in every direction; the original form of the insect is with difficulty made out, or the rings of which it is composed traced. The latter characters appertain especially to the *zacatillée* cochineal.

Exhausted black Cochineal. Cochénille noire épuisée.—Until the year 1840, the calico-printers, after having treated the cochineal several times with water, threw it away, as being completely exhausted. M. Lemoine, a dyer of Rouen, was, I believe, the first who thought of trying whether this cochineal, which the calico printers threw away, was really deprived entirely of its colouring matter. He found that it still contained about fifteen or eighteen per cent. of colouring matter. In the present day, the dyers buy this residue of the calico-printers, at from one franc eighty cents, to three

francs, the kilogramme. It is spread out in thin layers and dried in a current of dry air, and is then packed in casks for use. This cochineal having been exposed to the commencement of a decomposition, during its drying, has always the smell of putrid animal matter; it is black, having an amorphous appearance, often agglomerated in masses of different sizes.

The down of Cochineal.—There is sometimes met with in commerce, a grey, light substance, mixed with a great quantity of small black hard points; this substance is known by the name of *cochineal down*, or *cochineal siftings*. MM. Fée, Boutron Charlard, Bussy, and Guibourt, who have written on this insect, make no mention of this product. It contains about twenty per cent. of colouring matter.

These two products have lost much of the preference which was given to them by the dyers on account of their low price; because, that to obtain as good and as deep a colour with them, as that produced with the genuine cochineal, it is necessary to use three or four times as much of the substance, to which also a small quantity of unexhausted cochineal should be added; and because, also, this quantity of substance fills up the vessels employed, and is with difficulty detached from the fabrics which are dyed.

I am indebted to the dealers of this town (Rouen), for thirty samples of cochineal, on which I have experimented. In the houses which deal on the large scale in this article, I have always found the same kinds of cochineal: the pure grey cochineal, No. 1, or grey cochineal of the Canaries; the blackish grey or *zacatillée* cochineal, No. 2; and the black cochineal, or *zacatillée*, No. 3. This last is adulterated; the merchants purchase it as such. According to the intelligence which I have received from these parties, it appears that a great part of the cochineal which arrives at Bordeaux, is transformed into *zacatillée* cochineal. There are persons in that town who make this their express occupation. This cochineal is offered to the dealers at six, eight, and ten per cent. under the current price. Guibourt, as I have before said, has represented the practice of thus adulterating cochineal, as a proof that the black kind is better than the grey.

On carefully examining the *zacatillée* cochineals of commerce, knowing, at the same time, that they are always sold under the trade price, I thought there were but two kinds of adulteration likely to be practised; the first would be to roll the cochineal while moist in some black heavy powder, such as oxide of manganese, for the purpose of changing the colour and at the same time increasing the weight; the second would be to deprive the cochineal of its white downy covering by immersing it in boiling water, which would at the same time remove a part of the colouring matter. The first method appeared to me to be scarcely admissible, as a part of the black powder would become detached by rubbing, and would thus expose the fraud. The irregular form of this cochineal, and the rose-coloured hue which it presents, tend to confirm the opinion that the second of the above supposed methods of falsification, is that most frequently practised. I think, from the examinations I have made, that the grey cochineal is treated with hot water, so as to extract a part of its colouring matter; and that by this immersion the insect is deprived in great measure of its white hairy covering, and is thus transformed into black *zacatillée* cochineal. Whatever be the means adopted, it is certain that the black cochineal is less rich in colouring matter than the other. Hitherto there has been no easy means known by which the purchaser could estimate the different degrees of quality in this article.

In the specimens of cochineal obtained, as before stated, from different dealers, I have found that it is principally in the black, and blackish grey kinds that foreign matters are present. Rubbed, and treated with water, the above specimens have in seven cases yielded sand, and in four, metallic matter. Examined with the microscope, the metallic powder had the appear-

ance of lead filings. Treated with nitric acid a solution was obtained which gave the reactions peculiar to that metal.

Estimation of colouring matter.—The colouring matter of cochineal being soluble in water, I have used this liquid for exhausting the different kinds of cochineal for these experiments. The following is the method I have pursued :—Fifty parts of each kind of cochineal to be examined are dried at 122° Fahr., and are then treated five times successively, for an hour each time, with 200 parts of distilled water at the heat of a water-bath ; to every six ounces of water thus used, two drops of a concentrated solution of alum is added, which is necessary to bring out the colour of the cochineal, and enable a comparison to be made of the relative intensities of solutions obtained from different specimens. A further addition than the above of the solution of alum must be avoided, as it would cause a precipitation of lake.

The dealers in cochineal usually estimate its quality in buying it by dyeing a portion of wool with a given quantity of it, the result being compared with that produced by an equal quantity of a specimen of approved quality. Being desirous of furnishing the dealers with a more easy method than that hitherto adopted for this purpose, I endeavoured to exhaust the cochineal by one treatment with water, and found that eight grains (troy) of cochineal treated with thirty-six fluid ounces of distilled water for an hour, at the heat of a water-bath, with the addition of ten drops of concentrated solution of alum, was almost entirely exhausted. The liquor when cold was perfectly transparent, and gave the same results with the colorimeter as that obtained by the other process. The apparatus employed consisted of two flasks of suitable capacity, suspended in a vessel of boiling water. The weight of each flask with its contents was taken before applying the heat, and at the end of that part of the process the original weight was made up by the addition of fresh water.

For estimating the quality of cochineal by the colorimeter, two solutions are to be made as above described, one from a standard specimen of cochineal, and the other from the specimen to be estimated. These are introduced into two colorimeter tubes so that the liquor in each tube shall stand at zero of the scale, which is equivalent to one hundred parts of the best specimen. The tubes are now put into the box and the depth of colour compared by looking through each column of liquid, the box being so arranged that the light enters the bottom of each tube under similar circumstances. If there is a difference observed in the depth of colour in the two liquors, water is to be added to the deepest (usually that taken as the standard) until they are both brought to the same shade. The number at which the liquid now stands in the tube to which the water has been added, as compared with that indicated by the liquid contained in the other tube, and which, not having been altered, will represent one hundred, will be the relation which the two specimens bear to each other in their value as colouring agents. Thus, for instance, if the solution obtained from a standard specimen of cochineal requires the addition of sixty parts of water to reduce it to the same depth of colour as that obtained from some other specimen, this will indicate that the relative values of these two specimens are in the proportion of 160 to 100.

CONCLUSIONS.

1st. That the adulteration of cochineal, by the admixture of some metallic matter, as pointed out by M. Boutigny, is practised, although not frequently.

2d. The different kinds of cochineal may be easily classed, according to their value, as colouring agents. The kind called rose cochineal, and the grey cochineal, of best quality, appear to be richer in colouring matter than any other met with in commerce. Next to these may be placed the ordinary grey cochineal, and that called *zacatillée*. Then comes the inferior grey

cochineal, and the *zacatillée*, which I consider to have been sophisticated, and generally exhausted of part of the colouring matter.

3d. A specimen of cochineal may be sufficiently exhausted by one treatment with water, so as to give a correct indication of its value as a dyeing agent.

4th. I am induced to believe that the value of cochineals depends, in great measure, upon the cultivation of the insect, and the country in which they are grown.—*Journal de Pharmacie.*

REVIEW.

OUTLINES OF CHEMISTRY, *for the use of Students. By* WILLIAM GREGORY, M.D., Professor of Chemistry in the University of Edinburgh. *With numerous Engravings on Wood.* Part I. *Inorganic Chemistry.* 1845.

THE author of this compendium has been for several years favourably known to the world by ingenious researches and practical improvements, in that science, of which he has been deservedly appointed Professor of its oldest and most celebrated chair in this kingdom; and we trust that he will exert his talents to restore the school to that distinction which it possessed under Cullen, Black, and during the early career of Hope. The small work before us is a fair presage of his future career. In its Introduction, consisting of about one-sixth of the whole, he discusses the chief doctrines of chemical philosophy in a masterly manner; under the heads of the elements, affinity, combination, decomposition, definite proportions, equivalent numbers, proportional compounds. atomic theory, symbols and equations, uses of formulæ, combination by volumes, isomorphism; and, finally, isomerism. The remainder of the volume is devoted to concise but clear descriptions of the several objects, simple and compound, belonging to the inorganic kingdom; distributed as usual into the two great classes of metalloids and metals. The last section treats of salts, arranged according to their acid constituent, and not their bases.

His style is uniformly plain and perspicuous; such as becomes a philosopher solicitous only to inculcate useful truths on the minds of his students, in the easiest and most impressive manner.

In a short Preface, he apologizes for the omission of certain subjects, usually treated in elementary works on Chemistry; as heat, light, electricity, and magnetism; considering that they properly belong to Physics, and should be studied in the school of Natural Philosophy. We are not disposed to dispute the abstract propriety of such a division of labour, but we think he would have much improved his work, by a brief outline of the leading doctrines of caloric, in so far as it serves to change the

constitution of compound bodies. Its fleeting phenomena, which leaves substances in *statu quo*, do not, strictly speaking, fall under the cognizance of the Chemist. Dr. Black defined Chemistry to be "the study of the effects of heat and mixture on all bodies, with a view to the improvement of the arts, and the knowledge of nature." Probably he devoted too great a portion of his course of lectures, though it was the most delightful portion, to the science of caloric; while his present successor has, in our opinion, gone to the other extreme. We regard the admirable Handbuch of Professor Gmelin, now in course of publication, and to which our author refers, as an excellent model, in respect to physico-chemical illustration; since he has introduced a view of the most interesting doctrines of heat, light, electricity, and magnetism, which are, indissolubly connected with Chemistry, without trenching on the distinct domain of Physics. One of the most interesting works ever laid before the chemical world, was the physico-chemical researches of Gay Lussac, Thenard, Humboldt, and others, in the Memoires d'Arcueil—a work which proves how much benefit these twin studies can confer by co-operation on each other. We present the following passage to our readers, as a fair specimen of our author's clear manner of illustrating a subject, which has been somewhat mystified by writers.

"When a compound contains three or more elements, the symbols are written simply one after the other, with the necessary figures. Thus, sugar is represented by C_{12} H_{10} O_{10}: that is 12 eq. carbon, 10 eq. hydrogen, and 10 eq. oxygen. Alcohol is C_4 H_6 O_2.

"If we wish to show that any compound of three or more elements really contains two compounds, it is expressed in the following manner: Alcohol, C_4 H_6 O_2, when viewed as a compound of ether and water becomes C_4 H_5 O +H O. Benzoic ether, C_{18} H_{10} O_4 becomes C_{14} H_5 O_3 (benzoic acid) + C_4 H_5 O (ether)

"In this way we find it quite easy to express in symbols the composition of the most complicated substances. For example, crystallized alum is composed of 1 eq. neutral sulphate of potash, 1 eq. tersulphate of alumina, and 24 eq. of water of crystallization. This is expressed in symbols, as follows:

$$K\,O, S\,O_3 + Al_2\,O_3.\,3SO_3 + 24\,H\,O.$$

And this abbreviated expression contains, in a line, in addition to the general information concerning alum printed above, more information as to details than could be given in a page of print. It informs us for example, that alum contains 4 eq. sulphuric acid, of which 1 is combined with 1 eq. of potash, and 3 with 1 eq. of alumina: that alumina is a sesquioxide of aluminum: that 1 eq. alum contains 1 eq. potassium, 2 eq. aluminum, 4 eq. sulphur, 24 eq. hydrogen, and 40 eq. oxygen, &c. &c. &c.

"There are, besides the direct information thus conveyed by symbols, two most important uses to which they are applied.

"The first is, to render easily intelligible the view taken by a writer of any chemical change, however complicated. This is done by means of a formula or equation: in which all that is essential is, that the sum of the various

symbols should be the same on both sides. Thus, to take an example previously described in words (at p. 19), the action of oxide of potassium on hydrochloric acid. This is expressed in a formula as follows :

$$K\,O + H\,Cl = H\,O + K\,Cl.$$

"Here the symbols on the left are those of the bodies which act on each other, oxide of potassium and hydrochloric acid: while those on the right are the symbols of the new compounds produced, water and chloride of potassium.

"Or, to take a more complicated case :

"Sugar, $C_{12}\,H_{10}\,O_{10}$, when acted on by 6 eq. of hypermanganate of potash, $K\,O, Mn_2\,O_7$, gives rise to 6 eq. of oxalate of potash, $K\,O, C_2\,O_3$, 12 eq. of peroxide of manganese $Mn\,O_2$, and 10 eq. of water.—All this is briefly and clearly expressed by the equation

$$C_{12}\,H_{10}\,O_{10} + 6\,(K\,O, Mn_2\,O_7) =$$
$$6\,(K\,O, C_2\,O_3) + 12\,Mn\,O_2 + 10\,H\,O.$$

"The second very important use to which these equations are applied, is, that of calculating the quantities of the different substances which must be employed, in order to operate as economically as possible, and likewise the weight of the products which ought to be obtained. Thus, in the last example, we wish to know what proportions of sugar and hypermanganate of potash ought to be used, that nothing of either should be wasted : and also how much oxalate of potash, peroxide of manganese and water, will be obtained. By means of the above equation, and the table of atomic weights, we can easily make all these calculations. Since the equivalent or atomic weight of a compound is the sum of those of its elements, it is obvious that the equivalent of sugar is equal to the sum of 12 eq. of carbon + 10 eq. hydrogen + 10 oxygen. Now by the table, the equivalent of carbon is 6, that of hydrogen 1, that of oxygen 8. Hence the equivalent of sugar is $= 6 \times 12 + 1 \times 10 + 8 \times 10 = 72 + 10 + 80 = 162$. In like manner, the equivalent of hypermanganate of potash is found to be in round numbers 160. For every 162 parts, therefore, of sugar, we must employ 6 times 160 $= 960$ parts of hypermanganate of potash. The whole materials employed amount to 1122.

"On the other hand, we obtain of oxalate of potash, the equivalent of which is (in round numbers) 84, 6 equivalents $= 504$; of peroxide of manganese, the equivalent of which is 44, 12 equivalents $= 528$; and of water, the equivalent of which is 9, 10 equivalents $= 90$; the whole products amounting to 1122.

"It is hardly possible to exaggerate the value of so easy a method of representing chemical changes, and of making all the necessary calculations connected with them. Every chemist, and every student of chemistry, ought to be quite familiar with the use of chemical formulæ ; and, indeed, without this knowledge, it will soon be impossible to read chemical writings. The use of formulæ enables the writer so easily to put before his readers, in a very small space, any conceivable view of the phenomena, such as might require pages to explain in words, that they are now universally employed."

THE SALE OF SPIRIT OF WINE.

Mr. Dexter, of Queen's Row, and Mr. Pegler, of 38, Ebury Street, Pimlico, were summoned to appear at the Excise Office on the 6th of March, to answer to the charge of having sold spirit of wine without a licence.

Mr. Holmes, an Excise-officer, deposed, that on the 25th of November, 1844, he had applied to Mr. Dexter for half a pint of spirit of wine. He stated, that Mr. Dexter enquired whether it was for medicinal use, and that he replied he was ignorant for what purpose it was required, on which the spirit was sold to him. He produced a six-ounce bottle of spirit, without a label, stating that he had transferred it from the bottle in which it was sold to him into the one produced in evidence. He had written the name on the cork and kept it in a closet until the present time.

Mr. Dexter pleaded not guilty; and brought his servant, who deposed that she had repeatedly heard her master refuse to sell spirit of wine, except for medicinal use; and, on one occasion in particular, which she believed was the one alluded to, she had heard him distinctly state that, unless it was to be used medicinally, he would not sell it.

The Board did not consider the evidence of the servant sufficiently clear and satisfactory to refute that of the officer, and a fine of £10 was inflicted.

Mr. Holmes then deposed, that on the 25th of November, 1844, he had applied to Mr. Pegler for half a pint of spirit of wine. He stated, that in answer to the usual enquiry he had replied, that he did not know for what purpose it was required, and the spirit was then sold to him. He produced as before a bottle, without a label, which he admitted was not the one in which the spirit was sold to him. Mr. Copelin, Mr. Pegler's assistant, deposed, that the last witness had applied to him about nine o'clock one evening for half a pint of spirit of wine. He replied that he could not sell it except for medicinal use, and called Mr. Pegler out of the back parlour. The customer, in answer to Mr. Pegler's enquiry, stated, that it was ordered by a medical man to make a lotion for a lady in Ebury Square, and accordingly the spirit was sold. Mr. Holmes then swore that he did not apply to the last witness for the spirit, as he was outside the shop putting up the shutters, but that he had applied to Mr. Pegler himself, who sold it to him while no other person was present, and without any assurance that it was for medicinal use. Mr. Copelin insisted upon the truth of his statement, which was very clear, excepting that he did not recollect the day of the week

or month, a circumstance not surprising, as the occurrence took place about three months ago.

Mr. Pegler stated, that on that occasion he sold the spirit of wine in consequence of an assurance given by the Chairman of the Board of Excise to a deputation of the Pharmaceutical Society, which waited on the Chancellor of the Exchequer, in December, 1843—that the Board would not enforce the penalty in cases where spirit of wine was required for medicinal use; and he had always observed this restriction. He mentioned that a member of the deputation (Mr. Bell) was in attendance to substantiate this statement.

The Chairman said, that was not the question. He did not consider it proved that the spirit was sold for medicinal purposes. The evidence of Mr. Pegler could not be taken, because he was the party interested; and as the evidence of his assistant was at variance with that of the Excise-officer, and as the assistant did not recollect the day of the week and the day of the month, which the Excise-officer had stated with great precision, the Board believed their own officer, and discredited the other witness, consequently a fine of £10 was inflicted. The only remedy for this infliction was an appeal to the Quarter Sessions; but, in that case, the full penalty of £50 would have been claimed, and recovered with costs, if the verdict were against the defendant; and as the Board of Excise has the power of inflicting the penalty in any case, whether the spirit were sold for medicinal purposes or not, such an appeal would have been worse than useless, as it would have entailed upon the defendant an expense about ten times the amount of the fine.

It is a remarkable fact, that while the evidence of Mr. Pegler was not admitted in corroboration of that of his assistant, because Mr. Pegler was an interested party; the evidence of the Excise-officer was credited in opposition to that of Mr. Pegler's assistant, although the latter was a disinterested witness, and the former was entitled to half the penalty in case of conviction.* The same witness (the Excise-officer) had, in the case of Mr. Dexter, convicted himself of a contradiction, (we use a mild term,) by swearing that he had bought half a pint of spirit of wine of Mr. Dexter, and that he had put it into the bottle which he produced, which was a six-ounce bottle. He did not produce the

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* Penalties and forfeitures incurred under *any* Acts of Parliament relating to the Excise, after deducting the costs, are to be distributed, one moiety to the Queen and the other to the officer of excise who shall discover, inform, or sue for the same. Sec. 103, 7 and 8 Geo. IV., chap. 53.

In Excise and Customs' cases, both informers and officers are competent witnesses, notwithstanding their interest in the penalty. Sect. 75, 7 and 8 Geo. IV., chap. 53. 3 and 4 William IV., chap. 53, sect. 118.

bottle in which it was purchased, nor the label, and his testimony rested on his own *ipse dixit*, that he had left it in a closet from the time that he bought it. Again, the sale of the spirit in both cases, occurred in November, 1844, the trial came on in March, 1845, after an interval of about three months. The Excise-officer, who had laid the trap, was clear in his evidence respecting the date, as might be expected. The circumstance that Mr. Pegler's assistant did not recollect the date was adduced as a reason for disbelieving him altogether. But the *disinterested* (?) Excise-officer was not suspected of any *mistake* by the Board, whatever might have been the opinion of the audience.

The Chairman of the Board of Excise, distinctly assured the deputation, at the Treasury, on the 23d of December, 1843 (see vol. iii. p. 368), that in the event of any abuse of authority in any Excise-officer being discovered, "he would certainly be reprimanded, if not discharged." But it would appear, that such a discovery is not likely to take place, since the testimony of an Excise-officer, *in the Excise Office*, is at a premium, while that of a *disinterested* witness is at a discount. To obtain justice under these circumstances would be difficult; we, therefore, recommend our brethren, when applied to by a stranger for spirit of wine to refuse to sell it, unless the party will give a written order, stating that it is required for medicinal use. This precaution is especially necessary in shops where there is only one assistant, as Excise-officers are too cunning to lay a trap where they must face several witnesses.

CHANGES IN THE CUSTOMS' ACTS.

Our readers are aware that the duties on many drugs are about to be repealed, and that in those which will remain in force, some alteration will be made. We have in type the list of these articles, and had intended to publish it this month, with some observations on the new tariff; but pressure of other engagements has prevented our devoting the needful attention to the subject; and our space being otherwise occupied, we defer the article until next month, by which time we shall be able to give a more definite and authentic report than we could at this moment, while the bill is on the eve of passing. We need only observe at present, that although the list is rather long, the amount of duties repealed is very small, and will scarcely be felt either by the trade or the public.

TO CORRESPONDENTS.

ERRATUM.—Last number, page 434, line 3, *for* 106° Fahr. *read* —106° Fahr. or 106° below zero.

B. M.—The taste of common salt and the smell of yellow resin are essential characters, of which they cannot be divested.

C. (An Associate)—TINCTURE OF ARNICA MONTANA. Two ounces of the root to 16 ounces of proof spirit; macerate as usual. Some persons recommend the flowers.

T. T. (Hanley)—ESSENCE OF CAMPHOR is made by diluting camphorated spirit with spirit of wine. The addition of a small quantity of tincture of myrrh has been recommended.

M. P. (Leicester).—The colour of tinct. secale cornutum depends, in some degree, on the freshness of the ergot, and it fades by keeping.

"A MEMBER" (1.) wants a formula for "heel ball."—(2.) TINCTURE OF ACONITE: Root recently dried and coarsely powdered, 1 lb.—Rectified spirit, Ojss. Macerate for fourteen days. Dose, five drops. (Turnbull). TINCTURE OF ACONITINE: Aconitine 8 gr.—Rectified spirit 2 oz.—Used as an embrocation. (Turnbull).—(3.) Oxide of iron is sometimes deposited from tinct. ferri sesquichloridi.

A. Z. (1.) should write to the Stamp Office, Somerset House.—(2.) See the second answer.

P. J.—(1.) We believe that spirit is generally added to essence of senna; which is not miscible with fixed oils.—(2.) To extract all the active principles from Cayenne pepper, it should be treated first with rectified spirit and then with water.

J. E. L.—Unguentum hydrargyri nitratis assumes a green colour when mixed with ceratum cetacei, arising from the reduction of a portion of the mercury.

"MARINER."—Unfermented bread. See vol. iii., page 495.

"STUDENS."—Apply to the Lecturers.

Mr. GOODWIN.—There are several makers of "True James's Powder." We cannot pretend to decide which is the most authentic.

J. H.—Mercury unites with tin as an amalgam by mere contact.

"INQUISITOR."—Aromatic spirit for fumigation may be made by dissolving any essential oils in rectified spirit, according to fancy. We have no experience in the manufacture of sealing wax.

E.C.C., M.P.S.—For neutralizing the odour of castor oil when used in pomatum, some strong essential oils will answer, such as bergamot, cassia, oil of bitter almonds, &c. We cannot improve on the formula of our Correspondent.

"AN INEXPERIENCED STUDENT."—(1.) Florum.—(2.) No.—(3.) See vol. iv., page 267.

Mr. ELSALL.—(1, 2.) We cannot improve upon the formulæ already given.—(3.) Yes.—(4.) We are not learned in "Cosmetics."

"O formose puer nimium ne crede colori."—*Virgil.*

"TYRO."—Hydrogen gas may be obtained by adding diluted sulphuric acid to zinc or iron filings.

Mr. Pyne.—We never heard of permanent red ink for marking linen.

"Chemicus."—(1.) See Dr. Ure's Paper on Alkalimetry; vol. iii. pp. 430 and 483.—(2.) We believe the best preservative for the teeth is cleanliness, assisted by any simple tooth powder.

"Socius."—(1.) Compound spirit of aniseed is sold as aniseed cordial.—(2.) We think proof spirit would be a better menstruum for the tonquin-bean than rectified.—(3.) The green colouring matter of vegetables may be separated from the juice by a temperature of from 180° to 200°. The albumen thus coagulated carries the chlorophylle with it.—(4.) Yes. See Notices on the inside of the cover.—(5.) We think the process of percolation better than concentration by boiling for making concentrated infusions.

"An Associate."—We believe that dyers obtain a green colour by first dyeing with yellow and then with blue.

"An early Member" (Liverpool) complains of the number of disreputable shops which have lately been opened in his neighbourhood for the sale of drugs, and thinks it very desirable for a law to be introduced prohibiting any persons but educated Chemists from commencing the business. [We quite agree in this opinion.]

T. C.—It is impossible for us to predict what clauses may be introduced into the Pharmaceutical bill.

A. P. S. (London) should enquire of the Secretary, giving his name.

"Marrubium."—(1.) The only Board of Examiners at present constituted by the Pharmaceutical Society is in London.—(2.) The best companion to the sea medicine chest that we have seen is by Charles M'Arthur, M.D., small 8vo, p. 76; published by Orr and Co., Paternoster Row.—(3.) See the leading article of this number.

℥j.—(1.) *Dr. Christison's Materia Medica*; price 18*s.*—(2.) Application should be made to the Secretary.—(3.) We have frequently given a very good reason for not publishing the Lectures entire.

L. N. B.—(1.) See the above.—(2.) *Lindley's Elements of Botany.*

C. A. D.—Braconnot's papers have appeared in the *Journal de Pharmacie*, we believe they have not been published separately.

"Alpha."—Citrate of Iron. See *Pharmaceutical Journal*, vol. i. pp. 552, 594, 595, 653. *Dunglison's New Remedies Pharmaceutically and Therapeutically considered*, is a good work. It was published in Philadelphia, and may be obtained of Wiley and Putnam, Paternoster Row, London.

"An Associate."—See *Aikin's Dictionary of Chemistry*, and *Ure's Dictionary of the Arts.* Also *Dictionaire de l'Industrie*, t. x., art. *Savon*, Paris, 1841.

H. A. T.—*Herbert Mayo on Syphilis*, 8vo, price 5*s.* 6*d.*, 1840.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street, before the 20th of the month.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. XI.—MAY 1st, 1845.

THE PROGRESS OF SIR JAMES GRAHAM'S MEDICAL BILL.

In our last number we noticed with regret the determined opposition which was manifested in the profession to the proposed bill, even in its modified form, and notwithstanding the considerate and courteous manner in which Sir James Graham had met the turbulent remonstrances of the dissentients. At that time the opposition appeared rather formidable, on account of the united and organized character which it had assumed under the auspices of the National Association of General Practitioners, backed by Mr. Wakley, who has for upwards of twenty years been the zealous and unflinching advocate of that party. But during the last month an important change of events has taken place—the once formidable opposition is broken up into factions, the concentration of influence is at an end, and the members of the Association are wasting their strength and energy in contentions among themselves. Consequently the supporters of Sir James Graham's Bill have little or nothing to fear from their opponents.

Our readers will probably recollect, that shortly after the close of the last session of Parliament, the General Practitioners of Marylebone and Westminster formed themselves into an Association. Subsequently, at a large meeting held in Hanover Square Rooms, the "National Protection Assembly," or Association of General Practitioners, was formed, and the two Associations were amalgamated into one. A Provisional Committee was appointed, and the two grand objects of this united Association were—First,

to oppose the Medical Bill ; and secondly, to obtain an incorporation of the General Practitioners into a distinct body by Act of Parliament.

So strenuous was the Editor of the *Lancet* in favour of this latter project that, in the leading article of the number for December 14, the following passage occurs :—

" It would be pusillanimous not to acknowledge, that if the attempt which is now in progress for forming the General Practitioners of this kingdom into ONE VOLUNTARY CORPORATION, for their own protection, *fail*, such a disaster would at once decide the fortunes of the profession, and render certain the success of the Bill."

The fundamental principle on which it was proposed to constitute this corporation, was that of fair and adequate *representation*, and the absence of this principle in the College of Surgeons in its present form was urged as the ground upon which the new Association was required as a remedy. It was proposed by Mr. Wakley that the National Association should prepare the draft of a bill, which, when approved by the body at large, should be submitted to Sir James Graham for his consideration.

This measure was frustrated by the following resolution, which was passed at the close of a meeting of the National Association, when the bulk of the meeting had dispersed :—

" That the cordial thanks of the Meeting be given to the Provisional Committee, for their zealous attention to the matters intrusted to their care, and for their report ; and that the members composing it be earnestly requested to continue their exertions as a Committee, with *full power* to adopt *all* such measures as they may deem expedient, for the purpose of obtaining a Charter of Incorporation for the General Practitioners, with a proper modification of the Bill, and of bringing *all the objects* of the Association to a satisfactory *termination*."

By this resolution absolute and irresponsible powers were conferred on that Committee, the members of which were intrusted with the management of the affairs of the Association during their will and pleasure. Some members of the Association were dissatisfied because Mr. Wakley was not on the Committee ; but when the name of that gentleman was proposed, the Committee

declined to make any addition, stating, that the number (seventy-two) being complete, no other names could be added. It was also objected that only one of the seventy-two Committeemen resided more than ten miles from London, which circumstance was considered at variance with the principle of fair representation ; but this remonstrance also was unheeded. A requisition having been made to the Committee to call a general meeting to make by-laws for the government of the Committee, and to consider the draft of a new bill, the Committee declined acceding to this request, expressing their disapproval of the proposal to originate a new bill, and alleging that by-laws for their guidance were unnecessary and manifestly improper; stating, also, that they would call a general meeting as soon as they should deem it necessary or expedient. The Committee in the mean time proceeded to conduct the affairs of the Association with closed doors.

The dissatisfaction which has been occasioned by this course of conduct appears from the following resolutions, passed at a meeting of the Association held March 29th :—

Resolved, "That the Committee, styling itself 'The Committee of the National Association of General Practitioners' having refused, at this critical crisis, to call a *General Public Meeting of the Association*, and having unanimously resolved, 'That by-laws are unnecessary for the government of the Committee, and that such by-laws would be manifestly improper,' that the said Committee has forfeited the confidence of this meeting; and that, in the opinion of this meeting, it is disentitled to the confidence of the members of the Association generally, and of the profession."

Resolved, "That the practice adopted by the permanent Committee, in holding its sittings *in secret*, to the exclusion of every member of the Association, of the public, and the press, and then publishing *its own reports* of its own discussions, its calumnies and misrepresentations, is subversive of every principle of reason and justice, and is calculated to bring the character of the Medical profession into disgrace and disrepute, not only with her Majesty's Government, but with every portion of an intelligent community."

Mr. Wakley contends—

"That the decision of the assembled members ought to be deliberately taken on the two questions:—Whether it is advisable to apply to govern-

ment for a charter to establish a separate, distinct incorporation of General Practitioners ? or, Whether they should seek for enfranchisement in the existing College of Surgeons of England ?" — *Lancet, April* 5, page 386.

The Committee, however, has adopted another means of deciding this question, namely, that of putting both these expedients simultaneously to the test of experiment; and accordingly overtures of capitulation were made by the Committee to the College of Surgeons, and prior to the receipt of a reply, an address was forwarded to the Society of Apothecaries, proposing a joint application to the Government for the Charter of Incorporation.

The reply of the College was not satisfactory to the applicants. In reference to the proposal of the Committee to enfranchise all the members of the College, or, in other words, to make every General Practitioner in the kingdom a "Fellow," the Council reply that this would be a contravention of the objects for which the College was founded, namely, the promotion of the art and science of SURGERY; and that "the lavish and indiscriminate grant of the fellowship would effectually destroy a distinction which, if conferred on all, would be no distinction, and could confer no honour on the individual possessor." The Council also put the proposition of the Committee to the test by enquiring—

"Whether they would include among the Fellows those who have violated the laws of their country ? Would they include professional paupers and persons of notoriously bad character ? Would they include the puffers and vendors of nostrums and secret remedies, and the writers of indecent advertisements ? Would they include Surgeons' Assistants, or those who have connected themselves in business with Druggists and Chemists? Would they include the retail shopkeepers who expose for sale cattle drugs and perfumery ? Would they, finally, include all those who keep open shops, and who, though ill-sustaining their professional character, are yet not chargeable with any moral disqualification ? In short, would the National Association, in conformity with their views, advise admitting all such as members of the proposed College of General Practitioners, without discrimination or selection, merely because they are members of the College of Surgeons, or licentiates of the Apothecaries' Company ?"

The College of Surgeons having declined to accede to any of the proposals of the Committee, Mr. Wakley's second question is decided, and the only alternative remaining is the application to Government for a Charter of Incorporation. But on this point the Association is not so unanimous as it was a few weeks ago. Mr. Wakley, the original proposer of the scheme, admits that it is a grave question, and one which demands rigid investigation. He observes—

"The creation of a fourth Medical Corporation in London would be an admitted evil; but if the profession be left simply to declare—if in fact, they be driven to the sad extremity of determining whether there shall be no enfranchisement, or whether they shall be invested with corporate privileges in a distinctly new institution; we know they would determine, by an overwhelming majority, for the latter alternative. * * * * * The desire for the *reduction* in the number of the medical corporations is an ardent one, and it is acknowledged that the creation of a *fourth* would be a calamity: and it could only be sought for, therefore, as the less of two evils."—*Lancet*, April 12, p. 415.

Again, Mr. Wakley declares (April 5, p. 392), that "The English College of Surgeons is the legitimate home of the General Practitioners;" and observes (page 390)—

"Instead of having a *fourth* College as a mere *chartered* institution, prudence and sound policy dictate that even the existing licencing institutions in the metropolis ought to be reduced to *two*—the College of Physicians and the College of Surgeons: that the graduates in Medicine should qualify at the one, the graduates in Surgery at the other; and that the examinations at both Institutions should be as nearly as possible the same."

Thus we are glad to find that the Editor of the *Lancet* has adopted entirely our view of the case (see *Pharmaceutical Journal*, vol. iv., page 392); for although in the above observations Pharmacy is not mentioned, it is quite obvious that if Mr. Wakley's views respecting the two Colleges could be carried out, the institution of a College of Pharmacy would be the necessary and immediate result; and until the accomplishment of this end, the work of medical reform would not only be incomplete, but its objects would be to a great extent frustrated. We repeat, that

unless medical legislation comprises Pharmacy, it is a dead letter; and on the supposition that the *prescribing* departments in the profession are to be comprised in the two institutions—the College of Physicians and the College of Surgeons—the *immediate creation* of a COLLEGE OF PHARMACY becomes a matter of absolute necessity.

The creation of a College of General Practitioners is at variance with these views, as this Institution would (as its name implies) confer on its members a *general* qualification, comprising "medicine," surgery, midwifery, pharmacy, &c. &c., and thus the great bulk of the profession would consist of Practitioners not distinguishable in their legally recognised character and functions from the Practitioners who flourished in the days of Hippocrates.

This event, however, is not much to be apprehended. A revolution, especially one of a retrograde nature, could only be brought about by an *organized* and *united* effort on the part of the whole mass of the persons concerned in it: and this is not very likely to take place in the present instance, as the opinion appears to be gaining ground, that the creation of a new Medical Corporation would not be so conducive to the general interests of the Profession as the adaptation of the existing Colleges to the requirements of the body at large.

Since the above was in type, we have received a report of proceedings which tends to confirm this impression, and from which it appears that a reconciliation is likely to take place between the contending parties.

We shall endeavour, in our next number, to show in what manner the interests of our body are especially concerned in the above question.

On Monday, the 22d of April, Sir James Graham intimated to the House of Commons, his intention to postpone the second reading of the Medical Bill until Friday, as he was not prepared to state at present the alterations he intended to make. It was his intention before Whitsuntide to go into Committee *pro formâ*, when he would fully state all the alterations he had to propose, and then adjourn the Committee to a future day.

THE LAWS OF CUSTOMS AND EXCISE.

We again defer the publication of the New Tariff, as it has not yet passed both Houses of Parliament. Several alterations have been made in the list in the Committee of the House of Commons, and, on the 20th of April, a corrected copy of the Bill was printed, which was read the third time in the Commons, on Tuesday, the 22d. We presume that before the publication of our next number, the Bill will have passed the House of Lords.

The Bill for repealing the duties on glass has passed the House of Commons, and, at the time of our going to press, is before the House of Lords.

We anticipate much public benefit from the repeal of the duty on glass. It is impossible for any manufacture to thrive under the auspices of the Excise. In the case of glass this system of espionage has hitherto been an effectual bar to any improvement. No man is likely to exert himself in making experiments with a view of ameliorating the quality of his goods when he is constantly under the eye of an Exciseman, and knows very well that if his experiment fail, he is nevertheless, liable to pay the duty, in addition to the loss of labour and materials; and should it prove successful, the secret is in the possession of a spy, who has it in his power to sell it to a rival manufacturer. Under the old system a manufacturer could not make a pound of glass without giving notice to the exciseman, whose duty it was to see the ingredients weighed and placed in the furnace whenever a batch of glass was manufactured. He then placed his seal on the furnace, and allowing a stated time for the application of the usual temperature, he returned at the appointed hour and weighed the result. Whatever might be the quality of the glass, the duty must be paid. A similar inspection was enforced in the case of the goods when manufactured.

The result of this system has been that, in the quality and economy of glass, this country is very much behind those in which no restrictions exist. A large proportion of the retorts, tubes, flasks, and other glass apparatus used in England for chemical operations is imported from Germany, and a vast quantity of ornamental glass from Bohemia. The ingredients of which glass is composed may be purchased ground ready for the furnace at £3 or £4 per ton, an amount quite insignificant when compared to the cost of the glass itself, even in the raw state. It is difficult to estimate the price at which glass will be produced and manufactured for use, in the absence of the imposts which have hitherto been attached to it. Not only is the duty itself a

very serious item, but the manner in which it is collected, and the oppressive circumstances in which the manufacturer is obliged to conduct his business, under such a system, operate as an obstacle to that wholesome competition which, if allowed to take its own course, reduces the cost of commodities to the lowest remunerating standard.

The laws of Customs and Excise are of necessity inquisitorial and oppressive. Unless the controlling boards possessed absolute power, and the officers were invested with an unlimited right of search, it would be impossible to collect a tithe of the tax imposed by law; and even with all the contrivances which are employed for this purpose, the revenue is not unfrequently defrauded. The prosecutions which have lately taken place for the alleged adulteration of tobacco, are a good illustration of the hardships belonging to the system. A sample is taken from a package of tobacco and submitted for chemical analysis to a chemist. He reports that it contains sugar, or condemns it on some other ground. The whole of the tobacco is seized, and the proprietor is exchequered. Further opinions are taken as to the chemical purity of the article, and these are at variance with those previously given. If the defendant be acquitted, no compensation is given for the heavy legal expenses, the anxious suspense, and the injury to his character, from the reports arising from the seizure of his goods. Having lost several hundred pounds by the action, which was founded on a vague suspicion afterwards discovered to be groundless, his only consolation is the reflection that he is liable to the same persecution every day in the year, and that no precaution which he can possibly take can secure him against a repetition of the infliction.

So completely are the dealers in excisable goods in the power of the officers, that it is policy, in almost every case, to plead guilty and claim the indulgence of the Court on that ground. It is extremely difficult to prove a negative, and unless this can be done, resistance is worse than useless; and it is often cheaper for an innocent man to plead guilty, than to incur the heavy expenses of an action, under circumstances so unfavourable to acquittal.

It is to be regretted that a means of raising revenue is not adopted which is less oppressive and objectionable than the Custom and Excise imposts: and the repeal of any of these laws cannot fail to give general satisfaction.

The manufacture of glass will, from the time the duty ceases, proceed untrammelled, and we may anticipate that in the course of a few years, a very material improvement will take place. Already we hear it proposed to apply glass to a variety of purposes for which it is admirably adapted, although it has hitherto

not been procurable at a sufficiently cheap rate. Pipes for rain-water, and for draining, and even the main pipes which supply water to the metropolis, will probably before long be constructed of glass. This substance is also likely to be employed for the roofs of houses; and we are informed that in Manchester, preparations are in progress for covering a street with glass; a plan which we have no doubt will be adopted in many other places.

The price of common glass has already fallen, in consequence of the repeal of the duty; but we understand that plate glass will not be reduced in price immediately, on account of a monopoly which exists, and a combination between the parties concerned. A short time only will be required for this monopoly to be broken down by the competition which is likely to ensue.

Another instance of the inconvenience and hardship attending the class of laws which we have been considering, will be found in the following report respecting

THE SALE OF SPIRIT OF WINE.

Since the publication of the report in our number for last month, several informations have been laid against Chemists and Druggists for selling spirit of wine, and various rumours have been in circulation respecting the manner in which the Commissioners of Excise have administered the law in these cases. In the *Morning Post* of Friday, April 11th, it was stated, in reference to the cases of Mr. Meredith and three other Chemists who had been informed against,* that Sir Francis Doyle, the Solicitor of Excise, had decided "that there was no statutary exemption in respect of the sale of even medicated spirit of wine." From this it was supposed that the assurance given to the deputation by the Chancellor of the Exchequer and the Chairman of the Board of Excise, on the 21st of December, 1843, had been overlooked, and that the Commissioners were determined to exercise their legal power to the full extent against the members of our body.

We are quite aware that there is no statutary exemption in the case, and it was explained in the report of the deputation (vol. iii., p. 366), that although the Chancellor of the Exchequer was disposed to administer the law with due leniency and forbearance in the cases alluded to, admitting that the public as well as the Chemists would otherwise have just reason to complain, yet, in reference to any alteration in the law, difficulties existed which to the Board appeared insurmountable. It was considered, that if a *legal* exemption were to be made in favour of Chemists,

* We are unable to give the particulars of these cases, as the parties have not favoured us with any communications.

the door would be opened to abuses which would give rise to a violation and evasion of the law to a serious extent; and the deputation were therefore assured that, while the Board claimed the full power conferred by Act of Parliament, every precaution would be taken to prevent unnecessary annoyance or severity, as well as abuse of authority on the part of subordinate officers. Copies of the report of the deputation were submitted to the Chancellor of the Exchequer and to the Chairman of the Board of Excise before publication, and these having been officially acknowledged and approved, we had every reason to hope that the question was finally and satisfactorily settled.

In consequence of the recent informations, and the rumours above mentioned, the subject has again claimed the attention of the Council, and endeavours have been made to come to a clear and proper understanding with the Board of Excise.

An information having been laid against Mr. Lamplough, of Holborn Hill, for having sold, on the 8th of January, a gill of spirit of wine, and the 17th of April having been fixed by the Board for hearing the case, three of the Members of the Council, who were on the deputation to the Treasury, in December, 1843, attended the Court. On the previous day, Mr. Bell had an interview with Mr. Wood, the Chairman of the Board, who stated, that the Board had kept constantly in view the assurance given to the deputation by the Chancellor of the Exchequer, and he kept a copy of the report for reference in any case in which doubt occurred. It was not the wish or the custom of the Board to enforce the penalties against Chemists for selling small quantities of spirit of wine *for medicinal purposes*, but the Board had received information that the practice of selling it indiscriminately was again becoming prevalent, and the recent informations had been instituted, in order to suppress this innovation. Mr. Wood observed, therefore, that the violation of the treaty was not on the part of the Board, but that certain individuals among the Chemists had broken faith, by habitually selling spirits for various purposes not connected with medicine. Mr. Bell remarked, that the Council of the Pharmaceutical Society would not presume to defend any of their members in the open and glaring infraction of the law; but they considered it their duty to watch over the interests of the members of their body, of whom they were the representatives, and to claim for them that amount of indulgence, which they had been assured would be granted, not only in justice to themselves, but also in consideration of the urgent wants of the public.

Mr. Wood repeated, that the Board was quite disposed to act upon this principle; but suggested that, as the power of the Board is absolute, it would be the best policy in the Council to

inculcate to their brethren the importance of avoiding any infraction of the law, except in cases where spirit of wine is required for medicinal use, this being the only exception allowed by the Board.

Mr. Bell complained of the interval which was allowed to elapse between the sale of the spirit and the issuing of the information, observing, that it was scarcely likely that after the expiration of three months, a young man could recollect the circumstances of the case so as to be able to meet, on equal ground, an officer who had made complete memoranda at the time, and was quite prepared with his case. Mr. Wood replied, that this delay was not intentional, but had arisen, in the recent cases, from the decease of the solicitor of excise, which had retarded the business. It was the wish of the Board to bring forward every case with as little delay as possible, and to give the accused parties every opportunity of making a defence.

The favourable impression conveyed by the above information was confirmed by the Board, in open Court, on the following day, when Mr. Lamplough's case was heard. The witness for the prosecution stated, that on the 8th of January he had called at the shop of Mr. Lamplough, between one and two o'clock, and asked for a gill of spirit of wine. In answer to the inquiry for what purpose he wanted it, he said "for an experiment." The young man replied, "Chemical, I suppose;" to which he made no answer, and the spirit was sold to him. Two of Mr. Lamplough's assistants were in Court, but the one described by the witness happened to be at home in charge of the shop, it not having been known beforehand which of the young men would have been accused. Consequently Mr. Lamplough was deprived of his principal witness; but the two young men who were present, deposed, that the general orders of the establishment were never to sell spirit of wine except for medicinal purposes; and, moreover, that the apprentices were forbidden to sell it for any purpose whatever. Mr. Lamplough expressed his regret that he had unconsciously become amenable to the law, as he imagined that the indulgence of the Excise was extended to the sale of spirit in small quantities for medicinal or chemical purposes. It was submitted that the experiment might have been with reference to some medicinal compound, but neither this supposition, nor the plea that it was required for a chemical purpose, were admitted by the Board. Mr. Lamplough appealed to the deputation; and Mr Morson stated, that the Chancellor of the Exchequer had assured them that the penalties would not be enforced for the sale of spirit in small quantities for medicinal purposes. The Board replied, that this was granted; but it was not admitted that, in the present case, the spirit was sold for a

medicinal purpose. As Mr. Lamplough had expressed his regret at the circumstance, and had proved by his two witnesses that the general orders in his establishment were in conformity with the law, the penalty was mitigated to forty shillings.

From the above report our readers will perceive, that no alteration has taken place in the administration of the Excise laws in reference to the sale of spirit of wine by Chemists, since the publication of our former statement in December, 1843. While we are sensible that Chemists are still liable to annoyance, in some cases where it might be supposed to come within their province to sell pure spirit of wine, we must acknowledge that the evil is materially diminished, by the present exception which is made in their favour, in those cases in which the privilege is of the greatest importance. It is obvious that a general and unlimited licence cannot be expected, for reasons already fully explained. We therefore have no alternative but to submit to the restriction from which we have no means of escape, and studiously to avoid and discourage any infraction of the law which might bring our body into disgrace, and thus be the means of diminishing the privilege already conceded. If through the misconduct of subordinate Excise officers, proceedings should be commenced against any members of the Society for selling spirit of wine for medicinal purposes, application should immediately be made to the Council, in order that a full and official investigation may take place. We trust, however, that this will not occur.

We have only to add, that it is not safe to retail spirit of wine without a written or printed order, dated and signed by the purchaser, and stating that it is required for medicinal use. These orders should be preserved, and might be produced in evidence in case of need.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF A
LECTURE ON THE MANUFACTURE OF SODA.

BY W. A. MILLER, M.D., F.R.S.,

Delivered March 26th, 1845.

The lecturer commenced by alluding to the striking illustration which the manufacture of soda afforded of the benefits conferred by science on the arts. It was only, he said, within the last half-century that this manufacture had assumed so important a position amongst the industrial resources of the country; and the advantages it is calculated to confer may be traced as resulting, indirectly, from the devastating wars of the French Revolution.

For many ages, a substance called *natron* was extensively used as the source of much of the soda of commerce. This substance is produced at particular seasons of the year from the waters of certain lakes in South America, in Thibet and Hungary, on the borders of the Caspian Sea, and especially from the trona lakes of Egypt. The carbonate of soda, of which this natron principally consists, results from a double decomposition which takes place between the chloride of sodium contained in the water, and the carbonate of lime abounding in the soil; and this decomposition, which would not occur under ordinary circumstances, is effected through the influence of efflorescence. This effect was illustrated by the lecturer with a mixture of common salt and chalk, moistened with water, from which, after being allowed to stand for some days, carbonate of soda had effloresced on the surface of the ingredients, and on the sides of the containing vessel. A similar efflorescence appears on the surface of the soil in some countries, especially in parts of Africa, and the salt is found to consist of sesquicarbonate of soda, mixed with chloride of sodium and sulphate of soda.

But the great source whence our supply of soda has been obtained, is the water of the ocean. Marine plants absorb the salt from the sea, decompose it within their organism, and convert it, principally, into oxalate of soda. These plants, after being dried, are burned in pits in the open air, and the oxalate is thus converted into carbonate of soda. The product of the combustion of certain species of salsola and salicornia, is called barilla, the best of which is brought from Alicant and other parts of

Spain. The product obtained from sea-weed on our own coast, especially from *Fucus vesiculosus*, is known by the name of kelp, but this is much less rich in soda than barilla.

Until the latter end of the last century, the French and other European nations obtained their soda principally from Spanish barilla; but the commerce in this article being interrupted by the prolonged wars of that period, the French government offered a prize for the best method of *manufacturing* the alkali. Several methods were in consequence proposed, but that which has superseded all others, and which now supplies the enormous and still increasing demand for this article, is the process invented by Leblanc.

In principle, this process is exceedingly simple. Chloride of sodium, whether in the form of rock-salt, bay-salt, or loaf-salt, as furnished for culinary purposes, is the material whence the soda is obtained. The object, then, to be effected, is to remove the chlorine, to supply its place with oxygen, and to combine the soda, so produced, with carbonic acid.

The first step in Leblanc's process consists in converting the chloride of sodium into sulphate of soda, by means of oil of vitriol; gaseous hydrochloric acid is disengaged, while sulphate of soda, or Glauber's salt, remains as the fixed residuum, and this, in the anhydrous state in which it is obtained, is called salt-cake.

The next or second step is to deprive the sulphate of soda of oxygen, and thus convert it into sulphuret of sodium. This is effected by mixing the salt-cake with carbon, in some form, and submitting the mixture to the action of a strong heat, in a reverberatory furnace, when the oxygen of the soda and of the sulphuric acid combines with the carbon to form carbonic oxide, which undergoes combustion, leaving a sulphuret of sodium more or less pure.

The third step is to decompose the sulphuret of sodium with carbonate of lime; sulphuret of calcium and carbonate of soda being the products.

In practice, however, the second and third steps are conducted at one operation. The salt-cake is mixed with rather more than an equal weight of chalk, and about half its weight of coal dust; and these ingredients having been intimately ground together, are put into what is called the black ash furnace. Here the changes already described are effected *pari passu*, and the residue at the conclusion of the action is called black ash, or ball soda. In this process a larger quantity of chalk is employed than is required to form sulphuret of calcium with the sulphur present, and thisis requisite, as the sulphuret of calcium alone is considerably soluble in water, but in combination with lime, as an oxy-sulphuret, it is nearly insoluble in cold or lukewarm water.

Carbonate of soda has thus been produced, but it is still necessary to separate it from the other substances with which it is mixed. With this view the black ash, or ball soda, is broken into fragments, and digested for five or six days in lukewarm water, by which the alkali is dissolved, while the oxysulphuret of calcium, and any excess of coal-dust or carbonaceous matter that may remain, subside to the bottom. Boiling or very hot water cannot be used in this part of the process, as it would decompose the oxysulphuret of calcium, and render the solution impure. Even with the use of lukewarm water, a little sulphuret is dissolved, which it is necessary subsequently to decompose.

The lixivium obtained from the black ash is evaporated until a pellicle of carbonate of soda forms on the surface; this being removed and drained in wicker baskets, is sometimes called basket soda.

The remaining liquor contains much caustic soda and some sulphuret: it is evaporated in a reverberatory, the floor of which consists of a cast-iron pan: in this the flame is made to pass over the surface of the liquid, by which arrangement a rapid evaporation is economically effected, the salt as it forms subsides, and, at the same time, the caustic soda is converted into carbonate by the carbonic acid, the product of the combustion. When the evaporation has been carried to the proper extent, the liquor still remaining, and which contains, principally, caustic soda with some sulphuret, is allowed to drain from the solid salt, consisting of carbonate of soda contaminated with some sulphuret, and a little caustic soda. This salt is called yellow alkali. For its further purification, it is mixed with about one-fourth of its bulk of saw-dust, and roasted in a common reverberatory furnace. In this process the sulphur burns away, and the last portions of caustic soda are converted into carbonate. The residue is again lixiviated, and the salt obtained on evaporation is called soda-ash. From this the ordinary carbonate of soda in crystals is formed by the usual method of crystallization; and the bicarbonate of soda is made by causing the absorption of an additional equivalent of carbonic acid.

In illustration of the economy now practised in manufacturing articles of this kind on the large scale, the lecturer stated, that the oil of vitriol used for decomposing the common salt, is usually made in connection with the manufacture of the soda. A description of the process by which this acid is now made from sulphur and from iron-pyrites was given, and illustrated by experiment, and by the exhibition of models of the apparatus employed. Models were also shown of the apparatus used in the manufacture of soda.

At the close of the evening, the lecturer exhibited a series of

preparations illustrating a process lately patented, by which the sulphurets of the metals, particularly of iron, copper, and tin, being intimately mingled with common salt, are roasted in suitable furnaces—the intermediate stage, with the costly apparatus requisite for the manufacture of oil of vitriol, is done away with, sulphate of soda is produced, and the sulphurets of the metals converted into oxides: by solution and crystallization, the sulphate of soda is obtained in a state of purity. The copper, if any be in solution, is precipitated by bars of metallic iron, and the oxides of tin and iron, which remain in the insoluble form, are separated by mere washing, the oxide of tin, from its gravity, easily subsiding. By this means the whole of the arsenic is got rid of at once, and ores containing quantities of copper and tin too small to be extracted by the old methods, are rendered advantageously available.

The carbonate of soda is extracted from the sulphate, by the usual process of decomposition with chalk and coal.

PHARMACEUTICAL MEETING,

APRIL 9th, 1845.

MR. MORSON, VICE-PRESIDENT, IN THE CHAIR.

FURTHER NOTICE RESPECTING SIBERIAN AND BUCHARIAN RHUBARBS,

WITH SOME REMARKS ON TASCHKENT RHUBARB.

BY JONATHAN PEREIRA, M.D., F.R.S.

In the paper published in the last number of the *Pharmaceutical Journal* on some rare kinds of rhubarb which have recently appeared in British commerce, I noticed four varieties of rhubarb. I have subsequently received from Mr. Faber some additional information respecting two of these, *viz.*, the Siberian and Bucharian sorts, which I beg to communicate to the Society.

I may observe that the following information has just been received from one of the first drug-houses at St. Petersburg, namely, Messrs. Dyrssen & Co., than whom, Mr. Faber assures me, no persons can be expected to give information upon which more reliance could be placed. The letter is dated March 18th.

1. SIBERIAN RHUBARB.

In my former paper, I stated that the rhubarb which I called Siberian, had been sent to this country as Bucharian. But three circumstances led me to conclude that it was Siberian. First, it

differed from Bucharian rhubarb which arrived here in 1840. Secondly, it was suggested by one of Mr. Faber's correspondents that it was not Bucharian but Siberian; and thirdly, it agreed with the Siberian rhapontic root described by Grassman.

My conclusions, it appears, are correct, and the drug firm above alluded to, in their letter to Mr. Faber, just received, observe, "from your minute description of the three chests of rhubarb, we are quite sure that it is and can be no other than our *Siberian radix rhapontica*. It is a distinct species, and is not the root-branches of either Bucharian or crown rhubarb."

2. BUCHARIAN RHUBARB.

The same firm, in the letter just referred to, observe, with respect to Bucharian rhubarb, that, "the true Bucharian rhubarb, of which we sent you samples in 1840, does not come to us by Brody, as you suggest, but by Nischny (or Nishnij), to which place it is brought in a crude state, and where it is trimmed for the Moscow market." Mr. Faber, however, assures me that he is confident that both true Bucharian, and also Siberian rhubarb under the name of Bucharian, have been brought by Brody; because one of his Vienna friends describes exactly the former, and the other exactly the latter: and both are to be depended on, and understand their business extremely well.

3. TASCHKENT RHUBARB.

By way of explanation respecting this rhubarb, it may be premised, that the rhubarb which is imported into England from St. Petersburg, and which is here commonly known as *Russian rhubarb*, is called in Russia *Chinese rhubarb;* while our Canton rhubarb is unknown in Russia: for it is the policy of the Russians not to admit China products by sea, as they have no sea communication with China; and consequently, rhubarb, tea, and other articles are not admitted from England.

In the letter from St. Petersburg to Mr. Faber, from which I have before made some extracts, the following observation occurs:— "The refuse of the true Russian rhubarb (here called Chinese rhubarb) comes to us by the way of Taschkent, and differs very little from the crown rhubarb. It is called here *Taschkent rhubarb*."

From this observation it is obvious that the suggestion contained in my former paper, as to the origin of Bucharian rhubarb, is not correct. Bucharian rhubarb is therefore a distinct sort, and is not the refuse of the crown rhubarb as I had supposed.

I am informed that in Russia the Bucharian and Taschkent rhubarbs are used for purposes for which the crown rhubarb is too expensive.

Chemistry of Rhubarb.—Grassman, to whose paper I have already several times referred, sent to Buchner, from St. Petersburg, four sorts of rhubarb, which were chemically examined by Dr. J. E. Herberger, some of whose results I here subjoin. I may premise, however, that the rhubarb which he calls *Chinese*, is doubtless the sort known in England as Russian. The *white rhubarb* is the kind to which I have referred in my *Elements of Materia Medica*, vol. ii., p. 1179, 2d edition.

Dr. Herberger subjected the rhubarbs to the successive action of ether, alcohol, and water, so that the residue which was unacted on by ether, was subjected to the action of alcohol, and the residue from which alcohol extracted nothing more, was then submitted to the action of water.

The residue which was thus undissolved by ether, alcohol, and water, was then incinerated. The lime contained in the obtained ashes was afterwards converted into oxalate of lime by means of neutral oxalate of potash. In this way was obtained the amount of oxalate of lime mentioned in the subjoined table:

	2 Decigrammes [=3.0868 grs. Troy] of the following Rhubarbs.			
	Bucharian.	Chinese. [Russian.]	White.	Siberian Rhapontic.
	Grammes.	Grammes.	Grammes.	Grammes.
Dry Ethereal Extract	0.0005	0.0005	0.0005	0.0010
" Alcoholic ditto.....	0.0030	0.0020	0.0020	0.0030
" Aqueous ditto.....	0.0095	0.0100	0.0110	0.0120
Oxalate Lime.....	0.0035	0.0040	0.0043	0.0015
	0.0165	0.0170	0.0178	0.0175
Other constituents of the Ashes—Woody Fibre..	0.0035	0.0030	0.0022	0.0025
	0.2000	0.2000	0.2000	0.2000

The white rhubarb, it will be perceived, contains more oxalate of lime than the other sorts. This constituent, with the starch, is the cause of the whiteness of this sort of rhubarb.

It is obvious, however, that no reliance can be placed on the results, on account of the minute quantities of the substances operated on.

FINSBURY SQUARE,
April 8, 1845.

ON A NEW VARIETY OF OPIUM.

BY MR. T. N. R. MORSON.

The importance attached to all matters relating to the complex chemical nature of opium, more especially such as affect its narcotic powers, or render it in any way unfit for the use of the Pharmaceutical Chemist, will be sufficient excuse for my presenting to the Society, in an imperfect state, a few observations on what is to me a new form of this drug, and one which has recently excited some little attention among purchasers.

Several chests of opium have been lately imported from Turkey, having, both in the size and weight of the lumps, and general external appearance, a very close resemblance to that variety known as Constantinople opium, so justly celebrated for its strength and purity, and which yields the largest proportion of morphia. A close observer, however, would see in the opium in question sufficient difference to attract his attention, it being unusually soft, and of unusually light colour; but these differences are by no means evidences of impurity, and consequently the opium found ready purchasers. Having been requested to give an opinion respecting its strength, I proceeded to examine it in the usual manner, and soon found it to differ materially from any specimen I had previously examined.

It is exceedingly difficult with this opium to obtain a bright aqueous solution, for whether cold or hot water be employed, the solution filters, even through cloth, with great difficulty, and if much concentrated, will not filter at all without constant change of the filter, and consequent loss of product. My first impression was, that it was altogether spurious, but having separated from it morphia, codea, meconic acid, and other of the usual constituents of opium, and considering these in connexion with its light colour and herbaceous odour, it appeared probable, at least, that the observable difference might result from a different mode of collection, and therefore that it required a more careful examination.

Sixteen ounces of the opium, divided into small pieces and placed in a moderately-heated stove until sufficiently dry to be reducible to coarse powder, lost three ounces in weight: this, after pulverization, was boiled in successive portions of alcohol, until eight pounds of this fluid had been employed, and filtered while boiling hot. The first solution became, on cooling, nearly solid; and even the last, although colourless, was sensibly turbid. These solutions filtered readily when perfectly cold, leaving a bulky gelatinous looking mass, equal in volume to the quantity of opium employed, but which by pressure was reduced to a small bulk, and when dry was in weight about one ounce, and

consisted almost entirely of a substance resembling wax, combined with an elastic matter resembling caoutchouc.

The opium, after treatment with alcohol, was then boiled in pure sulphuric ether, until all matter soluble in that fluid was removed, and the evaporated ether left one ounce of the waxy substance in a pure state, which, with the other products, is on the table.

My next object being to ascertain the quantity of morphia, the filtered alcoholic solutions were distilled, and the matters remaining in the water-bath acted on with distilled water to separate the resinous matter insoluble in that fluid and in the natural acid of the opium. The aqueous solution, treated in the usual manner, gave one ounce of slightly-coloured morphia. It also contained other principles common to opium.

The unusually large quantity of wax and caoutchouc contained in this opium, and the diminished quantity of morphia, render it quite unfit for general use. A microscopic examination of the insoluble part, which, unlike many other Turkey opiums, is in a state of minute division, shows it to have been largely mixed with the capsule of the poppy; and it is, therefore, probable that this opium is obtained by expression, instead of incision; or at least is very largely mixed with the expressed matters so obtained, and the powdered external coat of the capsule.

ON THE ADULTERATION OF FLOUR WITH POTATO-STARCH.

BY J. MOORE NELIGAN, M.D., M.R.I.A.

In the September number of the *Pharmaceutical Journal*, are contained some strictures, by Mr. Thomas Harvey, on the process, as given in Dr. Christison's Dispensatory, for detecting the above adulteration; and the conclusion derived from which is, that this process is entirely untrustworthy. By attention, however, to a few minute details, which are not mentioned by Christison, this process, which was first proposed by Gay Lussac, will be found no less simple than certain. By previously explaining the rationale of the test, those will be much more easily understood.

Iodine does not alter the colour of fecula, except the external tegument (amylin) of the microscopic particles of which it consists, be burst, so as to set the contained mucilage (amidin) free. This occurs when starch is boiled in water, or may be effected by triturating starch in a mortar with cold water. The particles of wheaten starch being much more minute than those of potato-starch, a much greater amount of trituration in a

mortar will be required to burst the tegumentary membrane of the former than of the latter. Hence, a slight degree of trituration of potato-starch with cold water will enable iodine to strike a blue colour with it.

It is requisite, therefore, in applying this test, to triturate only for a short time; and to employ an *agate* mortar. If a glass or enamelled mortar be used, their parietes are so smooth, that the particles even of potato fecula cannot be bruised sufficiently; and a Wedgewood-ware mortar presents so many asperities, that the tegument even of wheaten fecula is readily burst.

Dublin, March, 1845.

Mr. Redwood thought there had been some misapprehension as to the method of employing the test mentioned by Dr. Christison. It was certainly not intended that the tincture of iodine should be applied to the starch particles, as both wheat and potato starch would become blue when thus treated, either before or after trituration in a mortar. If, however, these two starches be respectively rubbed in a mortar with cold distilled water, and the liquid be then passed through a close filter, tincture of iodine will give a deep blue colour with the solution obtained from potato-starch, and only a yellow or reddish-yellow colour, with that obtained from wheat starch. He had not found that any precaution was necessary in regard to the kind of mortar employed.

ON THE STATE OF OXIDATION OF IRON IN SOILS.

BY RICHARD PHILLIPS, JUN.

Having for some time past directed my attention to the analysis of soils, I have been somewhat surprised at the remark I have met with in the works on Agricultural Chemistry of Professor Johnson and others, that the lowest state of oxidation of iron, or the protoxide, is, when occurring in soils, injurious to vegetation. My own experience having led me to the conclusion that, although it is not necessary to the fertility of a soil, that it should exist in that state, nevertheless, in all soils rich in humus it is so found. The grounds on which the statement I have alluded to has been brought forward, are the following:— Bog earths have been found to be unfit for vegetation; and the drainage-water from them, when used for the purposes of irrigation, to be poisonous to plants. Now, in these earths the iron exists as protoxide, and as there is much carbonic acid formed in them by the action of the oxygen of the atmosphere on the carbon of the large amount of humus they contain, the protoxide of iron, being soluble in this acid, is thus carried away by the

drainage-water. From the numerous examples I have had brought before me in the laboratory, I have selected the following six analyses as well illustrative of the fact I have before alluded to, that in most rich soils the iron is found principally in the lower state of oxidation.

The two first are analyses of the soil and subsoil of some of the best wheat land in the Lothians. The soils were brought from thence by my friend Mr. Wilson, and analyzed by him; in the soil he found the iron to be protoxide, whilst in the subsoil it existed as peroxide.

SURFACE SOIL.

Silica	77
Alumina	8.8
Iron *Protoxide*	5.4
Sulphate of Lime	.6
Magnesia, a trace	
Salts of Potash and Soda	1.
Organic Matter	5.
Moisture	2.2
	100.

A trace of phosphate of lime.

SUBSOIL.

Silica	68
Alumina	16.3
Iron *Peroxide*	7.4
Sulphate of Lime	.4
Magnesia, a trace	
Organic Matter	4.1
Moisture	3.8
	100.

Traces of salts of potash and soda.

The next is an analysis of a soil from Polder, in Belgium; it was likewise procured by the gentleman I have mentioned, and analyzed by him, his reason for obtaining it being its exceeding richness, the farmer from whom it came assuring him that it had not been manured for more than fifty years; it consisted of

Silica	61.5
Alumina	9.1
Iron *Protoxide*	3.1
Carbonate of Lime	16.4
Carbonate of Magnesia	.7
Salts of Potash and Soda	.8
Organic Matter	6.2
Moisture	2.2
	100.

Traces of humate and phosphate of lime.

The following is the analysis of a soil brought to me from India by a gentleman; it being there considered as one of great fertility:—

Silica	40.
Alumina	29.7
Iron *Protoxide*	14.
Carbonate of Lime	4.2
Carbonate of Magnesia	.6
Sulphate of Lime	.3
Salts of Potash and Soda	.4
Organic Matter	8.9
Moisture	1.9
	100.

Trace of phosphate of lime.

The next is the analysis of a soil from Berkshire, the farmer from whom I procured it, assuring me that it was the richest wheat land on his estate. I found it contained

Silica	68.
Alumina	12.4
Protoxide of Iron	5.
Carbonate of Lime	6.4
Sulphate of Lime	1.1
Salts of Potash and Soda	.5
Organic Matter	6.3
Moisture	.3
	100.

Trace of phosphate of lime.

The last example is one of what is termed a virgin soil; it was sent to me from Yorkshire, and with it were made some experiments which I shall afterwards detail. Mr. Smith, of Deanston, was kind enough to inform me that he considered it to be a soil of good quality, and the gentleman from whose estate it came, that it had been brought under very good cultivation. My friend Mr. Howard analyzed it, and found it to consist of

Silica	72.4
Alumina	12.
Sulphate of Lime	.4
Protoxide of Iron	5.1
Salts of Potash and Soda	.7
Organic Matter	7.4
Moisture	2.
	100.

Trusting that these results sufficiently prove the statement I have made, that the lower degree of oxidation of iron in soils is not injurious to vegetation, I shall proceed to consider the cause of its remaining unchanged, notwithstanding the tendency of iron in the lower state of oxidizement, to pass to the higher, when exposed to air and moisture. This fact may, I think, be accounted for by the carbon of the organic matter or humus converting, by its affinity for oxygen, the peroxide into protoxide, itself becoming carbonic acid; and that the oxygen of the air, having a greater tendency to combine with the carbon of the

humus than to convert protoxide into peroxide of iron, the former is left unchanged.

In order to prove whether this idea was borne out by fact, I passed, by an arrangement I shall presently describe, a gentle current of air for three days over about 200 grains of the soil I have last mentioned as having been analyzed; it was operated on as when brought to me, and contained 18.5 per cent. of water. From the 200 grains I obtained six grains of carbonic acid, equal to a loss of 1.63 grains of carbon; and on examination I found the degree of oxidation of the iron to have remained the same.

The arrangement was the following, being a modication of the apparatus of Liebig, for drying organic bodies:—The air was passed through bulbs, containing solution of caustic potash, by which it was deprived of all carbonic acid; it then passed over the soil, and having, by passing through a long tube containing chloride of calcium, been deprived of any moisture it might have acquired, through some bulbs partly filled with caustic potash, these were connected with a Woulfe's bottle, filled with water, and fitted with a syphon. Having ascertained the apparatus to be perfectly tight, the air was drawn through it, by the action of the syphon, and the second bulbs filled with caustic potash, which had been previously weighed, were found, as I have before mentioned, to have increased six grains in weight.

I proved that the iron was uninfluenced by any soluble organic matter, by washing two samples, the one with cold, and the other with boiling water: the first gave 1.95 per cent. of soluble organic matter and inorganic salts, and the latter 3.27; but in both instances, although the residues were dried with exposure to the air, the iron remained unchanged. That it did not exist in the state of the black or magnetic oxide was shown by its being non-magnetic when dissolved and precipitated, as that oxide, according to Liebig, still retains its magnetic property when thus treated.

The non-fertility of bog earths may, it appears to me, be perhaps accounted for from the organic acid they have been found to contain, supposed to be the suberic acid, but probably an acid peculiar to these earths. The action of the manures usually employed to bring them into a state of fertility, *viz.*, lime and strong oil of vitriol, is made apparent if we take this view, for by uniting with the first the organic acid would be rendered innoxious, whilst the second would destroy it; but neither of these agents would have any influence on the further oxidation of the iron, and the second would render it soluble; and what makes this idea more probable is, that I have found in all rich soils a soluble organic salt of lime to exist, and that these soils never possessed any acid properties. The poisonous character of the drainage-

water from these earths is explained by this view; but on the other supposition, that it results from the action of protoxide of iron, we can hardly, knowing as we do how immediately, when held in solution by carbonic acid, it is decomposed by exposure to the action of the atmosphere, imagine that these injurious effects could take place in the short time that would elapse before it became sesquioxide: and I have before pointed out that the soluble organic matter would have *no* effect in arresting this decomposition. The use of the red oxide of iron in a soil has been stated to be its power of retaining ammonia. I must confess, however, I am rather inclined to doubt that it is of any great value to it on account of this property, as all soils containing much of it are found to be of poor quality; but admitting this to be the fact, there does not appear to me to be any reason to doubt that this retentive power is equally possessed by the protoxide.

From the above observations I was led to the conclusion, that the preservative action of the humus on the protoxide of iron in soils, was probably analogous to that of sugar in some pharmaceutical preparations, particularly in that of the saccharated carbonate of iron of the Edinburgh Pharmacopœia. I therefore prepared some of it by the process there given, and found, on passing a current of air over a portion of it by the apparatus I have before described, that a small amount of carbonic acid was given out from it. I do not, however, wish to be considered as speaking positively as to this being the action of the sugar, although the experiment shown above would appear to render it probable.

[NOTE.]

Since writing the above communication, I have had brought before my attention a remark occurring in several agricultural works, that some clays require either burning or long exposure to the atmosphere, before they are fitted to be mixed with fertile soils; and as the iron in them is found to become peroxide during these operations, it has been brought forward as another proof of the injurious action of the protoxide of iron.

In my opinion, however, it is not because the iron is in the state of protoxide that clays require this treatment, but on account of its existing as sulphuret, which, as is well known, is hurtful to vegetation; and I believe that the appearance of oxidation assumed by them during exposure to the atmosphere, is nothing more than the decomposition of the sulphuret into peroxide of iron. That this decomposition would take place under these circumstances I may instance, in the case of an embankment of

clay on the Croydon railway, where, accompanied by the formation of sulphate of lime, it occurred so extensively as to destroy part of the work.

I have, on analysis, usually found deep clays to contain sulphuret of iron; and another proof of its existence in them may be adduced from the slaty clay usually accompanying the coal formation, where it is found so extensively as to be employed for the manufactures of alum and copperas.

Craig's Court, 9th April, 1845.

A communication was read from Dr. Royle with reference to the origin of East India kino. Several conflicting opinions having been expressed by Pharmacologists as to the tree which yields this product, Dr. Royle and also Dr. Pereira have for some time been endeavouring to procure authentic information on the subject. Dr. Royle has at length succeeded in ascertaining, from undeniable evidence, that East India kino is an exudation obtained from the *Pterocarpus marsupium*. He has also received an account of the manner in which it is collected, which account has been furnished by Mr. J. Brown, of Anjara Kandy, on whose estate the whole of the kino brought to this country is said to be produced.

The substance of the communication was only briefly stated to the meeting, as the paper was intended for the Scientific Committee, and it will therefore be brought forward at a subsequent meeting in a more mature form.

ORIGINAL AND EXTRACTED ARTICLES.

POISONING BY HYDROCYANIC ACID.

BY H. LETHEBY, M.B.
Lecturer on Chemistry at the London Hospital.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL

SIR,—I HAVE undertaken, at the request of Dr. Pereira, to forward you the particulars of a case of poisoning by hydrocyanic acid, which has recently come under my notice, and I must mention that I am indebted to Mr. Watson, one of the medical gentlemen who was called in, for an account of the symptoms and *post mortem* appearances.

H— L—, a young Jewess, aged 22, of short stature, and very deformed, but fat, and generally enjoying good health, had latterly complained of a slight pain in her side, for which, on Friday, March 21st, she consulted her medical attendant; he prescribed a mixture for her, directing that a fourth part should be taken

twice a day; and as deceased was also suffering from the effects of chilblains, he ordered her a lotion, containing, as I afterwards found by analysis, very nearly four grains of anhydrous prussic acid. By some mistake, however, the labels were reversed, and the unfortunate patient swallowed a quarter part of the lotion; a dose equivalent to a little less than one grain of the pure poison. At the time when this was taken, she was sitting in a chair; but she instantly jumped up, ran for a short distance, holding up her arms, and gasping as it were for breath; she then fell, became insensible, and was violently convulsed, the muscles of her face suffering great distortion, while her limbs were extended, and her head drawn down upon her shoulders. In this state she was conveyed to her bed, and was seen directly afterwards by Mr. Watson, who found her lying on her back, with the body drawn a little forwards; the limbs fixed and extended in tetanic spasm; the whole face swollen, turgid, and almost purple from congestion; the jaws clenched, and the mouth covered with foam; the eyes were half closed, but prominent and glistening, with their pupils widely dilated, and, as Mr. Hicks reports, quite insensible to the stimulus of light. She was breathing slowly, with deep, prolonged inspirations, and uttering a moaning noise; the pulse at her wrist was gone, although the heart still continued to beat with a feeble, fluttering effort. At this time, which was ten minutes before her death, the medical gentlemen had discovered that she was suffering from the effects of hydrocyanic acid, and they instantly adopted means for her recovery, but without the least avail, for the breathing became slower and slower, the body remained fixed and immoveable, and she died in about fifteen or twenty minutes from the time of her taking the poison.

The *post mortem* examination was made on the following Tuesday, that is ninety hours, or nearly four days after death: it was conducted by Messrs. Hicks, Watson, and Waterworth.

The body was livid, especially upon the dependent parts: the limbs were still extended and rigid, the fingers slightly clutched as if from spasm: the countenance turgid, the jaws fixed, and the eyes half open, prominent, and glassy.

On opening the *head*, they found the vessels, both upon the surface and in the substance of the brain, full of black, liquid blood. There was no fluid in the ventricles, nor was there any odour of prussic acid there. The *chest*, however, when cut into, gave out a *strong odour* of this poison, and it was still more evident in the fluid contained in the pericardium: all three of the gentlemen present were agreed upon this point—indeed, Mr. Watson, whose sense of smell is almost obliterated, had his attention directed to it by the peculiar sensation which it created

in the back of his throat. The *lungs* were highly congested, but free from tubercle or other disease. The *heart* was abnormally small, its valves were healthy, and its cavities filled with very black, uncoagulated blood. The *abdomen* did not present any trace of disease. The viscera were loaded with fat, the liver and gall-bladder normal, and the latter had not any peculiar blue tint. The stomach had a small red patch upon its interior, near the cardiac orifice, and it contained two ounces of a thick fluid, like biscuit and water; and although it smelt of prussic acid, yet, upon distillation, I could obtain only very faint indications of the presence of this poison; so faint were they, indeed, that if I had not been guided by the odour, they would in all probability have escaped my notice, for with a solution of nitrate of silver, which is the most delicate test for hydrocyanic acid, there was merely a slight opalescence. Upon testing the remainder of the lotion, which amounted to two fluid ounces in quantity, I obtained 9.2 grains of cyanide of silver: this would be equivalent to 1.85 grains of anhydrous prussic acid, and as the deceased took about half of this amount, it would make the dose a little more than .9, or nearly one grain of the pure acid—a quantity contained in 46 or 47 drops of the diluted hydrocyanic acid of the Pharmacopœia, or in 23 drops of Scheele's acid, taking it at four per cent.

Remarks.—This case may be regarded as one of very peculiar interest to the Toxicologist; the dose has been accurately determined—the effects were watched from the commencement—the *post mortem* appearances have been carefully reported—and from its being the result of accident, there is no reason to suspect that any of the facts were withheld or distorted. The principal points which it offers for consideration are the following:—

The Dose.—In this case a little less than one grain of absolute prussic acid, diluted with a fluid ounce of water, occasioned death in from fifteen to twenty minutes. It is the smallest fatal dose upon record; for although the Parisian epileptics are reported, in most of our works upon medical jurisprudence, to have been killed by .7 of a grain of prussic acid, yet there is very little doubt of this being an error, and I hope that we shall soon have the statement set right by some of the physicians who were appointed to inquire into that unfortunate circumstance. Now, in reasoning upon the present case, we are not for a moment to suppose that one grain of hydrocyanic acid, will, under *all circumstances*, produce death; on the contrary, the experience of almost every one, to say nothing of the case recorded, against this conclusion, would suggest that in this instance it was an unusually small dose for such a serious event. It has appeared from my experiments upon animals, that there are a great number

of circumstances which modify the action of this poison; for instance, anything tending to debilitate the system, such as bleeding, fatigue, want of food, or disease, or even a perfectly empty stomach, will tend to increase the susceptibility to its action: a tired or hungry dog may at any time be killed by a dose which a robust or a replete one would take with impunity; and in this case it must be remembered that very little food was found in the stomach, and that the deceased was at the time keeping the observances of the Passover. All that we can say, therefore, in reference to it is, that one grain of hydrocyanic acid *may* occasion death; and, however important or satisfactory it may be to the minds of a jury, to be able to say that such and such a quantity, and no less, would always produce death, yet we are not at present, and, as I apprehend, never will be, in a position to make such a statement.

The Effects of this Dose.—It appears that the effects in this case were manifested upon the instant. The patient had no sooner swallowed the poison, when she jumped up, looked wildly about her, ran a few steps, holding up her arms, and gasping as it were for breath. *Volition*, therefore, was not instantly destroyed, for she had time to run a short distance, but in less than a minute she fell, and was then insensible.* The *convulsions*, or rather the *tetanic spasms* which resulted, were very peculiar: she did not throw about her limbs at all, but they became firmly and rigidly extended; and if she had been lying in bed at the time, there would have been no disturbance of the clothes, notwithstanding that these effects were kept up for fifteen or twenty minutes. Now, this is a point of very great importance; it was a question in the Leicester case, whether a slow death by the action of this poison, would not be preceded by such powerful convulsions as to disturb everything upon the sufferer; and it must be confessed, that if we were to judge of the question from experiments upon animals, there would be no doubt of our answering it in the affirmative; I had come to that conclusion, and would have given evidence to such an effect, before I witnessed the two cases of poisoning at Mile-end. Here were two unfortunate lovers, who had taken prussic acid, fallen into each other's arms, and they must have died without a struggle, for they lay upon the bed, calmly embracing one another, as if in sleep, without a feature being disturbed; and cases have been published since, to show that convulsions are not necessarily the

* We have seen a cat, after having swallowed a strong dose of prussic acid, run several yards, and climb a perpendicular wall eight feet high: she then fell down suddenly from the top of the wall quite dead, and all muscular action having ceased within about half-a-minute of taking the poison.—Ed.

consequence of an over-dose of this acid. From an experimental inquiry into the reason of this, I am led to think that it is dependent on the state of the system, for debilitated animals will sometimes die without any scream or convulsion. It is also worthy of remark, that in this case there was *no scream*, the deceased did not speak after taking the medicine, nor was there any vomiting or relaxation of the sphincters. The scream, therefore, although sometimes produced, is not always to be expected—it was absent in a case recorded by Mr. Pooley in the *Medical Gazette* for April 4, and in the case of Sarah Hart there was a moaning noise produced. The immediate cause of death here, as in other cases which I have noticed, appears to be a tetanic or spasmodic condition of the respiratory muscles: it is manifested by the slow and laborious breathing, by the turgescence of the face, and the venous system generally, as well as by the foaming at the mouth, and these symptoms, joined to the convulsion, so simulate an epileptic fit, that the medical gentlemen who were called in, supposed at first that she was labouring under such an attack.

Post-mortem appearances were very similar to other recorded cases, the body was still rigid, and from the fluid state of the blood, it had gravitated and coloured the dependent parts. The venous system and lungs and heart were gorged with blood, and this was black and uncoagulated. The stomach exhibited the red patches which I have noticed in other cases. The gall bladder was not coloured blue. With respect to the odour, it was absent from the mouth, but very marked in the chest and stomach; in the contents of the latter, it formed the most positive evidence of the presence of prussic acid, for the chemical reactions were too feeble and uncertain for any conclusion: it is worth mentioning also, that one of the surgeons whose sense of smell has been nearly, if not quite obliterated by snuff, was able to recognise the poison by the effects which it produced at the back of his throat, and I believe that this is so important a character, that it will often serve to detect hydrocyanic acid, even when it is mixed up with substances having a very powerful odour—it is a sensation which cannot be masked.

In conclusion I must remark, that the preceding case has been reported by Messrs. Hicks and Waterworth in the *Medical Gazette* for April the 11th, and as that report differs in many important points from this account, it is my duty to refer to it, and to say that I believe the errors have arisen from some hasty and therefore imperfect notes which were given to Mr. Watson at the time I made the chemical examinations.

QUANTITY OF HYDROCYANIC ACID TAKEN BY THE PARISIAN EPILEPTICS.

On the trial of Tawell, in March last, a question arose as to the quantity of real or anhydrous hydrocyanic acid which produced the death of the seven epileptics at *l'Hospice de Bicêtre*, in 1829, for it was found that the cases were reported differently in different works, and that the statements of English toxicologists did not accord with the accounts given by French writers.

Dr. Christison (*Treatise on Poisons*, 4th edit., p. 770, 1845) says, that these unfortunates were killed each by a draught containing *two-thirds of a grain of pure acid*. He quotes as his authority Orfila's memoir on this subject, published in the *Annales d'Hygiène Publique*, t. i., p. 507 (1829).

On turning to the latter work, we find that Orfila states (p. 507) that each patient took *about twenty grains* (French = 16.4 grs. English) of *medicinal hydrocyanic acid*.

Now it is evident that Dr. Christison has assumed that this acid contained four per cent. of real or anhydrous acid, for

$$16.4 : 0.66 :: 100 : x = 4.06.$$

But at p. 752 of his work, he says, that the acid of Vauquelin contains 3.3 per cent. of real or anhydrous acid.

Both statements, however, are erroneous. For the acid prepared by Proust's (erroneously called Vauquelin's) process, described in the *Codex Medicamentarius* for 1818, contains only about 2.588 per cent. of anhydrous acid, as the following calculation proves:

The acid is prepared by decomposing, in eight parts of water, one part of bicyanide of mercury. Now, one part of this salt ($Hg\ Cy_2 = 254$) yields 0.2126 of real or anhydrous acid, for

$$254 : 54 :: 1 : x = 0.2126.$$

If, therefore, we add this quantity of acid to eight parts of water, we have 8.2126 parts of medicinal acid, containing 2.588 per cent. of real or anhydrous acid.

$$8.2126 : 0.2126 :: 100 : x = 2.588.$$

Now, the *syrup of hydrocyanic acid* at that time in use was prepared by mixing one part of medicinal acid with nine parts of simple syrup. So that 1000 parts of a syrup thus prepared would contain 100 parts of medicinal acid, or 2.588 parts of real or anhydrous acid.

But the strength of the acid actually employed in the preparation of the syrup taken by the epileptics, was in reality much stronger than the above, though the authorities we have consulted disagree as to the actual strength.

At page 497 of his *Memoir*, Orfila states, that seven grammes and ten centigrammes (=109.581 grains English, of the same

hydrocyanic acid as that which had been used at the Central Pharmaceutical Laboratory in the preparation of the syrup, yielded him five grammes, and twenty-nine centigrammes (81.644 grains English) of cyanide of silver. Now (Ag Cy = 134), this would indicate a percentage strength of 15 of real or anhydrous acid.

For 109.581 : 81.644 : : 100 : $x = 74.5$
and 134 : 27 : : 74.5 : $x = 15$.

At page 503 he refers to this analysis, and calculates that the acid of the Central Pharmaceutical Laboratory had the following composition:

"Anhydrous Acid 1.089
Water 6.011

7.100."

But our confidence in his statements is greatly shaken by his observation at page 498; where he says, that ten grains (= 8.2 grains English of the same hydrocyanic acid ("du même acide hydrocyanique qui avait été employé jusqu'alors") gave fifteen centigrammes (=2.31 grs. English) of cyanide of silver.

Now 8.2 : 2.31 : : 100 : $x = 28.17$
and 134 : 27 28.17 : $x = 5.67$.

So that, according to this result, the hydrocyanic acid employed contained only 5.67 per cent. of real or anhydrous acid. Here, then is a discrepancy which we are quite unable to account for.

In his *Traité de Toxicologie* (t. 11d., p. 285, 4me éd. 1843), Orfila says that each patient swallowed eleven grammes and fifty centigrammes (=177.49 grains English) of syrup, containing one gramme and fifteen centigrammes (= 17.749 grains English) of medicinal acid. This is a difference of 1.34 grains English between the amount of acid here stated to have been taken, and that mentioned in the memoir.

In the *Journal de Chimie Médicale*, t. v., p. 398 (1829) it is, said that each patient took 2 gros. 61 gr. (= 168 grains English) but at p. 399, 2 gros. 64 gr. (=169.6 grains) are stated. Devergie (*Médecine Légale*, t. ii., p. 821, 1836) says, 2 gros. 64 gr. of syrup, containing 5.64 grains (French = 4.62 grains English) of concentrated [anhydrous?] acid were swallowed.

Not being able to arrive at any satisfactory solution of the difficulty, we wrote to our friend Professor Guibourt for information as to the dose and strength of the acid actually taken, and we subjoin an extract from his letter:

"For some time I directed the operations of the laboratory of the '*Pharmacie Centrale des Hopitaux.*' At the period when the above catastrophe occurred, the hydrocyanic acid, and the syrup of hydrocyanic acid, had just begun to come into use. We had previously prepared the acid by Scheele's process, which is described in the *Codex Medicamentarius* for 1818, page 387;

afterwards we gave the preference to the process of Proust, which has been erroneously called Vauquelin's process, and which is described at page 390 of the same work; in fact, we had frequently prepared the syrup of hydrocyanic acid according to this formula, and, as I have stated in my Pharmacopœia, this syrup, which contained 1½ grain (French) of anhydrous hydrocyanic acid to the ounce (French), had been for some time employed without any ill effects being produced, although the dose was certainly rather strong.

"How did it happen, then, that this syrup which had been frequently used in the hospitals without inconvenience, produced the catastrophe which occurred at Bicêtre? I have stated the cause in the second edition of my Pharmacopœia. The fault, in the first place, rested with the authors of the Codex of 1818, who state at page 390, that the acid prepared by the process of Proust or Vauquelin has the same density (that is to say the same strength) as that of Scheele, while, in fact, it is much stronger. In the next place, it is stated, at page 389, that *the anhydrous acid, sp. gr.* 0.700, *mixed with an equal quantity of water, would be reduced to the density of Scheele's acid, the sp. gr. of which is* 0.900, and may be employed with much more safety for medicinal purposes. The consequence of this was, that the person who was engaged at the '*Pharmacie Centrale*,' in preparing the syrup of hydrocyanic acid for the Hospital of Bicêtre, having none of the acid prepared according to the process given at page 390 of the Codex, which alone ought to have been used, and finding it stated that this acid was the same as that of Scheele, finding it also stated on the previous page that Scheele's acid of sp. gr. 0.900 may be made with one part of anhydrous acid and one part of water, he made it in this way. Now, this acid contained, in fact, one third of its weight of anhydrous acid, so that the syrup sent to Bicêtre and *immediately* employed there, contained one-thirtieth of its weight of anhydrous acid, or 19 grains French weight (15.5857 troy grains) to the French ounce (472.56 troy grains)."

From this statement of Professor Guibourt's, it is evident that the fatal doses in the above cases contained at least 5½ troy grains of anhydrous hydrocyanic acid.

POISONING BY SYRUP OF POPPIES.

Mr. Bentham, of Huntingdon, informs us that during the past winter two cases of poisoning occurred in his neighbourhood, from the sale of syrup of poppies, by uneducated persons, for quieting children. Mr. Bentham states, that many of these persons who keep small chandler's shops, and sell drugs, are daily labourers, and leave their wives to conduct the business.

ON THE STATE OF PHARMACY IN MEXICO.

In the 13th Number of Travels and Descriptions of Countries, by Widenmann and Hauff-Cotta (1837, p. 67), are contained, a few observations on the State of Medicine in Mexico. In reading these through, and more especially in perusing the description of the proceedings of the government against quacks and unlicensed vendors of medicines, every honest Pharmaceutist must wish to see this class of men treated in the same way in every other country as in Mexico.

The Medical authorities in Mexico, are annexed to the Ministère de l'Intérieure. The *Protomedicat*, as it is termed, consists of a President, a

Dean, a Fiscal, and five members, all Doctors of Medicine, with a secretary and an usher.

Their duties consist in superintending the examinations in Medicine; in the inspection of the conduct of all medical men; to see that they confine themselves to the legal limits of their profession; in the direction of medical studies; in the inspection or visitation of the Apothecaries' shops; in the direction of the Medico-political measures in case of epidemics; in putting the laws into execution against quacks and unlicensed vendors of medicines of every description, who are to be rigidly prosecuted, and, in case of conviction, punished with fines, banishment, or imprisonment with hard labour;* lastly, in sending in monthly reports of the state of health of the previous month to the government, the reports being themselves founded on the observations and notes to be forwarded by all medical men in actual practice to the Protomedicat on this subject.

The Medical men are arranged under the usual heads of Physicians and Surgeons (the two classes being rigidly distinct), Accoucheurs and Apothecaries.

Physicians must be graduated Doctors of Medicine, but before they are permitted to practise, they must pass an examination (state examination) before the Protomedicat. If they are found duly qualified, they are bound by their oath to act in every case according to the best of their abilities and their conscience; to abstain from the performance of all surgical operations, unless they have passed the examination in surgery also, and not to prepare or dispense† medicines, much less to keep an apothecary's shop; further, not to take their own relations—even the most distant—under their treatment, to attend the poor gratis, to be content with moderate remuneration from the rich; and lastly, to promote the fulfilment of all religious duties on the bed of sickness and death, or they subject themselves to a fine of 10,000 maravedis (about forty piastres) for each case, in which one of their patients, by their neglect, dies without having received the sacrament. The law holds them, moreover, responsible for every culpable neglect of the duties of their profession.

The apothecaries are, in the first place by law, subjected to a rigid examination, and then to a periodical visitation of their shops, beyond the precincts of which no medicines are allowed to be prepared.

They are bound to reject all prescriptions not signed by a legal practitioner, to abstain from all medical or surgical practice, and never to quit their shops without leaving an approved and duly qualified substitute.

All their assistants must be acquainted with Latin, and capable of compounding medicines accurately and quickly, according to prescription and the directions of the Spanish Pharmacopœia. No one is permitted to open a shop or to take one, in a place where his father or father-in-law, son or son-in-law are established in medical or surgical practice.—*Correspondenz-Blatt für Süd-Deutschland.* Dritter Band, 1843

ON THE STATE OF PHARMACY IN POLAND.

BY FRANZ SOKOLOWSKY.

Although the Poles are groaning under a load of oppression, and their literature is confined to their own country, their public institutions, in general, are excellent, worthy of imitation, and in accordance with the state of civilization in Europe in general, as may be proved by inspection of the Medical regulations relating to Pharmacy in Poland.

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* A plan which would answer very well in all other countries.

† Then there are no dispensaries in Mexico! Happy land!

In the year 1839, a General Direction of Medical Affairs, with two subdivisions, was instituted in Warsaw, by an order of the Emperor and King. The one division, the Medical Council, is engaged in scientific subjects, Institutions of Education, Examinations, &c.; the other relates to medical police. Under this central direction are four medical inspectoria; so that for every two governments an inspectorium exists, constituted of three Physicians, one Assessor of Pharmacy, and one Assessor of Veterinary Medicine.

The whole range of Pharmacy is under the control of this General Board of Directors.

I. *Scientific Relations.*—As a preliminary condition to being articled to a Pharmaceutist, the youth must have gone through the fourth class of a public school, and pass an examination before the medical inspectorium, to show his sufficiency in languages and natural philosophy. When he has passed this examination, he is during three or four years apprenticed; at the termination of which period, he is admitted to the assistants' examination, which consists of compounding a few preparations in the presence of the Assessor of Pharmacy, and giving a circumstantial description of the operations; after which he is admitted to the *vivâ voce* examination, on theoretical and practical Pharmacy, Chemistry, Botany, Pharmacognosia, Zoology, Mineralogy, and Natural Philosophy. The minutes of the examination, together with the preparations he has compounded, are forwarded to the central Medical Council, which, according to the opinion of two of its members, confers on him the degree of *Assistant* of the *first* or *second class*. To obtain the degree of a *Provisor*, the assistant's degree must be of two or three years' date, and then the candidate must go through a course of scientific studies of two years' duration, either in the school of Pharmacy, at Warsaw, or at an Imperial university. The Provisor's examination is practical, as well as by written papers, and by *vivâ voce* examination. It must be passed before the Medical Council at Warsaw, and is far more difficult and more comprehensive than the Assistants' examination. When the Pharmaceutist has passed this examination creditably, he is sworn in as *Pharmaceutical Provisor*, and furnished with a diploma to that effect.

Two or three years after this he may aspire to the rank of Apothecary, by passing another examination still more difficult than the former one.

The school of Pharmacy at Warsaw has three professors, and besides being of large extent, contains excellent collections and specimens, and may be reckoned among the best in Europe. The number of students amounts to about sixty. The lectures are all delivered gratis.

II. *Medico-legal Relations.*—In this respect there exist the following standing regulations:—A diploma as apothecary solely entitles a person to keep a shop. Every prescription must, on receipt, be rated and entered into a book, and the prescription itself numbered according to the apothecaries' book (*protocol*). On the white or red label (according as the medicine is for external or internal use) must be marked (beside the directions for use) the number in the book, the name of the patient and that of the medical man, the signature of the assistant who made up the prescription, the price, and the date. On the back of the label, a copy of the prescription, which remains in the apothecary's shop, must be written out. Every medicine is to be sent out sealed. Every shop is visited once a year by the Director-General himself, or an inspector, aided by the Assessor of Pharmacy. The books of business, which are on these occasions rigidly inspected, are—1, the protocol, or prescription-book; 2, the book of sale over the counter; 3, the laboratory ledger; 4, the stock-book; 5, the poison-book; 6, the journal of correspondence with medical or other authorities. The central council publishes every year a list of all Physicians and Apothecaries in the kingdom, and a list of prices according to the fluctuations of the market,

calculated by the medical authorities. Every Apothecary is regarded and treated as a servant of the state, and every shop as a government institution. After a series of years, the Apothecary is pensioned as a servant of the state, or in case of offence punished as such. Every Apothecary is exempt from billet or taxation. Every Pharmaceutist, from the apprentice upwards, is exempt from military service. Christians are alone permitted to enter on a Pharmaceutical apprenticeship. The number of Apothecaries is strictly regulated in accordance with the population, so that the establishment of a new shop is only allowed in extraordinary cases, and then merely when the authorities of that district, and all Apothecaries within twenty-four miles of that place, consider the institution of a new shop imperatively necessary.

The supply of crude materials the Apothecary may draw from the country or from abroad, but all preparations he must compound himself. Consequently there exists no manufactory of medicinal preparations in the kingdom of Poland.

From this report, it is clear that the medical regulations in the kingdom of Poland are efficient, and that the Apothecary in general stands on a high scientific and professional footing, enjoys great protection from the government, and that the medical police regulations are strictly enforced for the benefit of the public in general.—*Correspondenz-Blatt für Süd-Deutschland.* Dritter Band, 1843.

DUFLOS' METHOD OF RURIFYING CRUDE HYDROCHLORIC ACID.

MM. Hensler and Riegel have tried this method, and found it to answer well.

Mix fifteen pounds of crude hydrochloric acid with five pounds of water and one ounce of sulphate of iron; expose the mixture to the air for some time, and when clear pour it into a retort, and distil, at a moderate heat, three-fifths or three-fourths.

The product of distillation is clear, colourless, of a proper degree of concentration, and quite pure. In the neck of the retort a yellowish white sublimate will be observed.—*Pharmaceutisches Central Blatt,* No. 55.

DISCOVERY OF A NEW METAL RUTHENIUM IN THE RESIDUE OF PLATINUM.

BY CLAUS OF KASAN.

The metal has, up to the present time, only been obtained in the form of a dark grey powder, which is considerably lighter than Iridium. It is named *ruthenium,* because it occurs in small quantities in a white substance, found in the residue of platinum, mentioned by Osann, and considered by him a peculiar metallic oxide, which he named the oxide of *ruthenium,* but which consists chiefly of silicic and titanic acids, oxide of iron, and zirconia.

The peculiar properties of this substance, differing from all other metals hitherto discovered in the residue of the platinum, entitle it to be considered as a new metal.—*Pharmaceutisches Central Blatt,* No. 54.

ATOMIC WEIGHTS AND EQUIVALENTS OF SIMPLE BODIES.

In referring to our preliminary observations of last year on this subject, we must again observe that the use of equivalents, instead of atomic weights, is everywhere gaining ground, and that we shall soon be able to omit the latter from our table. To render the numbers now in general use more conspicuous, we have on this occasion placed the equivalents first in the list. In the last year many alterations have been made, and many simplifications, which will be found pointed out in the Notes. Many of these new numbers are, perhaps, not to be regarded as fixed. Chemists in general seem to be unanimous in the opinion, that the more simple the numbers the more is the probability of their correctness. Thus, in organic analysis it is now almost universally assumed that C.=75, H.=12.5, N.=175, O. =100 ; and again Ag.=1350, Fe.=350, Hg.=1250, Ca.=350, Zn.=412.5, S.=200 ; and perhaps, also, that Br.=1000. The number for iodine is again more uncertain than ever, and chlorine and copper by no means appear to be multiples of hydrogen.

NAMES OF BODIES.	SYMBOLS.	EQUIVALENTS.		ATOMIC WEIGHTS.	
		O=100.	H=1.	O=100.	H=1.
Aluminum	Al.	171.167	13.716	171.167	27.432
Antimonium	Sb.	1612.904	129.243	806.452	129.243
Arsenicum	As.	940.084	75.329	470.042	75.329
Azote *a*	Ni.	175.000	14.000	87.500	14.000
Barium	Ba.	856.880	68.663	856.880	137.325
Beryllium or Glucinum (*Berz.*)	Be, G.	331.261	26.544	331.261	53.088
(*Awdejew*) *b*	—	58.084	4.654	58.084	9.309
Bismuth *c*	Bi.	886,918	71.069	886.918	142.139
All Equivalents	—	1330.377	106.600	1330.377	213.200
Boron	B.	136 204	10.914	136.204	21.828
Brominium	Br.	978.306	78.392	489.153	78.392
Marignac (*d*)	—	999.300	80 000	499.650	80.000
Cadmium	Cd.	696.767	55.833	696.767	111.665
Calcium (*Berzelius*)	Ca.	251.942	20.152	251.942	40.304
(*Dumas, Erdmann, & Marchand*) *e*	—	250.000	20.000	250.000	40 000
Carbon (*Berzelius*)	C.	76.438	6.125	76.438	12.250
Marchand and Erdmann) *f*	—	75.000	6.000	75.000	12.000
Cerium (*Berzelius*)	Ce.	574.796	46 051	574.796	92.102
(*Beringer*) *g*	—	577.000	46.464	577.000	92.928
Chlorine	Cl.	442.652	35.470	221.326	35.470
(*Marignac*) *h*	—	443.210	35.500	221.600	35.500
Chromium	Cr.	351.815	18.191	351.815	36.382
Copper	Cu.	395.695	31.707	395.695	63.415
(*Erdmann and Marchand*) *i*	—	396.000	—	—	—
Cobalt	Co.	368.991	29.568	368.991	59.135
Didymium	D.	—	—	—	—
Erbium	E.	—	—	—	—
Fluorine	F.	233.800	18.734	116.900	18.734
Gold	Au.	1243.013	199.604	1243 013	199.207
Hydrogen (*Berzelius*)	H.	12.478	1.000	6.239	1.000
(*Dumas and Erdmann*)	—	12.500	1.000	6.250	1.000
Iodine *j*	I.	1580.520	126.567	790.460	126.567

NAMES OF BODIES.	SYMBOLS.	EQUIVALENTS.		ATOMIC WEIGHTS.	
		O=100.	H=1.	O=100.	H=1.
Iridium	Ir.	1233.499	98.841	1233.499	197.682
Iron *k*	Fe.	350.000	28.000	350.000	56.000
Lanthanium *l*	La.	451.879	—	—	—
Lithium	L.	80.375	6.440	80.375	12.881
Lead	Pb.	1294.498	103.728	1294.498	207.458
Magnesium	Mg.	158.353	12.689	158.353	25.378
Manganium	Mn.	345.887	27.716	345.887	55.432
Molybdanum	Mo.	598.520	47.960	598.520	95.920
Nickel	Ni.	369.675	29.622	369.675	59.245
Niobium	Nb.	—	—	—	—
Oxygen (*Berzelius*)	O.	100.000	8.013	100.000	16.026
(*Dumas and Awdejew*)	—	100.000	8.000	100.000	16.000
Osmium	Os.	1244.487	99.722	1244.487	199.444
Palladium	Pd.	665.899	53.359	665.899	106.708
Phosphorus	P.	392.286	31.436	196.143	31.436
Platinum	Pt.	1233.499	98.841	1233.499	197.682
Potassium *m*	K.	489.916	39.257	489.916	78.515
Rhodium	R.	651.387	52.196	651.387	104.392
Ruthenium	Ru.	—	—	—	—
Selenium	Se.	494.582	39.631	494.582	79.263
Silicium	Si.	277.312	22 221	277.312	44.442
Silver *n*	Ag.	1350.000	108.000	1350.000	216.000
Strontium	Sr.	547.285	43 854	547.285	87.709
Sodium	Na.	290.897	23.310	290.897	46.620
Sulphur (*Berzelius*)	S.	201.165	16.119	201.165	32.239
(*Erdmann and Marchand*)	—	200.000	16.000	200.000	32.000
Tantalium	Ta.	1153.715	92.448	1153.715	184.896
Tellurium	Te.	801.760	64.250	801.760	128.500
Terbium	Tb.	—	—	—	—
Thorium	Th.	744.910	59.646	744.910	119.292
Titanium	Ti.	303.662	24.332	303.662	48.664
Tin	Sn.	735.296	58.920	735.296	117.840
Uranium *o*	U.	750.000	60.000	750.000	120.000
Vanadium	V.	855.846	68.578	855.846	137.157
Wolframium or Tungsten	W.	1183.000	94.795	1183.000	189.590
Yttrium *p*	Y.	402.514	32.254	402.514	64.508
Zinc *q*	Zn.	412.500	33.000	412.500	66.000
Zirconium	Zr.	420.201	33.670	420.201	67.340

NOTES.

a According to *Dumas* and *Stas*, 175.8. According to *Svanberg*, 174.37. *Marignac* (*Central Blatt*, 1844, p. 751) 175.25.

b *Central Blatt*, 1842. p. 631. Beryllia=Be O. According to *Damour* (*Central Blatt*, 1843, p. 783), it is more probably $Be_2 O_3$.

c The treatise by *Werther* (*Central Blatt*, 1843, p. 76) renders it almost certain that the oxide of bismuth is $Bi_2 O_3$ and consequently that the old number 1330.3 should be again adopted. *Jacquelain Central Blatt*, 1838, p. 296. *Heintz* inclines to *Werther's* opinion in a paper we shall publish on a future occasion.

d *Central Blatt*, 1844, p. 797.

e *Central Blatt*, 1842, p. 711, and 1843, p. 300.

f *Dumas* takes half the quantity.

g *Central Blatt*, 1842, p. 566. *Hermann* (*Central Blatt*, 1843, p. 854) takes a round number 575—92 (equivalent 575—46).

h *Central Blatt*, 1844, p. 751.

i *Central Blatt*, 1844, p. 353.

j *Marignac* found (*Central Blatt*, 1844, p. 797) 1585.5.

k According to *Stromeyer* and *Wackenroder* (*Central Blatt*, 1844, p. 47) =349.533. According to *Svanberg*, *Norlin*, and *Berzelius* (*ibid* page 699)= 350.3. According to *Erdmann* and *Marchand* (*ibid* page 702)=350.1.

l According to *Choubine*; *Rammelsberg* found it 454.88. *Hermann* (*Central Blatt*, 1843, p. 858) takes 600—96 (Equivalent 600—48). According to *Mosander* (*Central Blatt*, 1843, p. 770) the atomic weight is 580.

m *Marignac* (*Central Blatt*, 1843, p. 60) gives the atomic weight of potassium as=490; latterly (*Central Blatt*, 1844 page 751)=488.94.

n *Marignac's* last opinion (*Central Blatt*, page 751) 1349.01.

o According to *Rammelsberg* and *Peligot* (*Central Blatt*, 1843, page 577) 174.407. *Ebelman* contends for 742.875. *Wertheim* (*Central Blatt*, 1843, page 586) 746.35.

p The recent experiments of *Rose* (*Central Blatt*, 1843, page 605) and *Mosander* (*Central Blatt*, page 771) render these numbers dubious.

q *Jacquelain* found 414. *Alex. Erdmann* (*Central Blatt*, 1844, page 685) 406.6. *Favre*, on the other hand (*ibid* p. 475), 412.5.—*Pharmaceutisches Central Blatt*, Jan. 1845, No. 1.

REVIEWS.

HANDBUCH DER CHEMIE. Von LEOPOLD GMELIN, Prof. d. Chemie an der Universität zu Heidelberg, &c. Zweiter Band; *Leichte Metalle und Spröde unedleschwere Metalle.* Dritter Band; *Ductile unedleschwere Metallè, und edle Metallen.**

Communicated by Dr. Ure, F.R.S.

OUR indefatigable author proceeds with unflagging power and spirit in his gigantic enterprise, embodying in one work of moderate size all the important facts and doctrines of Chemistry, while he assigns to each its due place and proportion, with minute references to their origin and progressive development. The *lucidus ordo* has never, we believe, been exemplified in such a masterly manner. Many years of laborious compilation and meditation must have been devoted to the production of this wonderful book, and profound judgment exercised in selecting the true and the valuable results from the uncertain, false, and frivolous. The copiousness of the information upon each subject is no less surprising than its precision. One could hardly have imagined *a priori* that so much positive knowledge could have been comprehended in so few pages as we find here, and all this without

* *Manual of Chemistry*, by Leopold Gmelin, Professor of Chemistry in the University of Heidelberg, &c. Second Volume is light metals, and non-noble, brittle, heavy metals. Third volume, ductile, non-noble heavy metals, and noble metals.

incurring the Horatian censure, *Brevis esse laboro, obscurus fio*, for never did a more perspicuous pen delineate the complicated phenomena of molecular science.

Prefixed to each chapter is a list of the treatises or authorities referred to in the matter which it contains.

Professor Gmelin deserves peculiar praise for the simple, straightforward structure of his sentences—a great virtue, which he possesses in common with the best philosophical writers of England and France, but which is little cultivated by those of Germany, who delight in complex periods of a page, where one proposition is involved within another, like the spherical ivory shells of a Chinese toy. We think we cannot better promote the objects of this Journal, and of the Pharmaceutical Society, than by exhibiting a full specimen of our author's manner of treating a subject, and we select with this view a part of the 24th chapter, entitled ARSENIC.

"SCHEELE, *Opusc.* 2, 28, also Crell N. Entd. 3, 125.
"BERGMAN, *Opusc.* 2, 272
"BUCHOLZ, Arsenic acid, *Scher. J.* 9, 397. Arsenious acid, *Schw.* 1, 3.
"LAUGIER, *Ann. Chim.* 85, 26.
"FISCHER, *Schw.* 6, 236 ; 12, 155 ; 39, 364. *Kast. Archiv.* 11, 224.
"THOMSON, degrees of oxidation of arsenic, *Ann. Phil.* 4, 171; also *Schw.* 17, 422. Arsenical salts, *Ann. Phil.* 15, 81, also *Schw.* 29, 430.
"BERZELIUS, *Ann. Chim. Phys.* 5, 179 ; 11, 225.
"GEHLEN, relation of arsenic to potash, *Schw.* 15, 501.
"GAY LUSSAC, relation of arsenic to potash, *Ann. Chim. Phys.* 3, 136.
"PFAFF's arsenic acid, *Schw.* 14, 95.
"BUCHNER, arsenic acid, *Schw.* 14, 419.
"GUIBOURT, *Journal de Chim. Medic.* 2, 55
"STROMEYER, de hydrogenio arseniato. *Comment. Societ. Gotting.* 16, 141
"PROUST, arseniuretted hydrogen, *Scher. J.* 8, 285. Sulphuret of arsenic, *Sher. J.* 9, 287 ; also *Gilb.* 25, 178.
"THENARD, sulphuret of arsenic, *Ann. Chim.* 59, 284, also *N. Gehlen*, 2, 685.
"BERZELIUS, sulphuret of arsenic, and its combinations with other metallic sulphurets, *Schw.* 34, 46 ; also *Pogg.* 7, 1, and 137.
"DUMAS, arseniuretted hydrogen, and chlor. arsenic, *Ann. Chim. Phys.* 33, 355; and *Pogg.* 9, 308.
"SOUBEIRAN, arseniuretted hydrogen gas and hydroguret of arsenic, *J. Pharm.* 16, 335 ; also *Pogg.* 19, 191 ; an extract in *Schw* 58, 222.
"GRAHAM, arsenical salts, *Phil. Trans.*, 1833, 2, 253, also *Pogg.* 32, 33.

"*Arsenik.* Scherbenkobold*, Näpfchenkobold†, fly poison, arsenic, cobaltum of materialists.

"*History.*—It has been long known, especially as sulphuret of arsenic and arsenious acid. Brandt, in 1733, made the first exact experiments on its chemical nature. Scheele discovered, in 1775, arsenic acid, and arseniuretted

* Potsherd goblin. † Bowl goblin.

hydrogen gas; H. Davy discovered hydroguret of arsenic; Berzelius investigated ably the atomic relations of arsenic, and its numerous compounds with sulphur.

"*It occurs native* as arsenious acid, as arseniate of lime, of magnesia, of lead, of protoxide, peroxide of iron, and sesquioxide of iron, of cobalt, of nickel and copper, as bisulphuret and tersulphuret of arsenic, as a sulphuret of arsenic combined with other metallic sulphurets, as in Fahlerz, Tennantite, light Rothgiltigerz, and Silberkupferglanz, in combination with another metal, in arsenical manganese, arsenic iron, arsenical cobalt, and arsenical nickel, in combination with another metal, and also a metallic sulphuret, as in arsenical pyrites, cobalt glanz, nickel glanz, and in much of the nickel antimony glanz. Small portions of arsenic and its combinations are found also in other ores, and their resulting products, as in sulphur, sulphuric acid, phosphoric acid, phosphorus, in sulphuret of antimony, and preparations made from it, in zinc, tin, and in several peroxides of iron, also in the olivine found in the meteoric iron of Siberia discovered by Pallas, and that of Atacama, but not in terrestrial olivine. Rumler (*Poggend.* 49, 591). The statement of Orfila and Couerbe (*J. Chim. Méd.* 15, 462 and 632) that the bones and muscles of healthy men, and the bones of healthy horses, oxen, and sheep contain arsenic was disproved by Danger and Flandin, also by Chevallier (*J. Chim. Méd.* 17, 84), by Barrot, Fauré and Magouty (*J. Chim. Méd.* 17, 854), Pfaff (*Repert.* 74, 106), Steinberg (*J. Pr. Chem.* 25, 384), and Jacquelin (*Compt. Rend.* 16, 30) and was afterwards retracted as unfounded, by Orfila himself (*Ann. Chim. Phys.* 77, 150).

"*Manufacture on the large scale.*—By heating arsenical pyrites in earthen tubes till the arsenic be sublimed; whereby the pyrites=Fe_2 As S_2, becomes 2 Fe S, as a residuum, while As sublimes. The tubes, which are numerous, and laid horizontally in the furnace, are about three feet long, and one foot in diameter. Into the open projecting end of each, a rolled up pipe of sheet iron, about eight inches long, is pushed one-half of its length into the earthen tube, and to the outer end of this pipe an earthen receiver is luted to it. The arsenic sublimes into the iron pipe as a loosely adhering crystalline mass, which is removed, when the furnace has become cold, by uncoiling the sheet-iron pipe.

"*Purification, by repeated sublimation.*—The arsenic of commerce contains partly suboxide and partly sulphuret of arsenic, which are more volatile than the metal; and sometimes, fixed impurities, as portions of the rock, of the pyrites, &c. By the sublimation the oxide and sulphuret are dissipated in vapour, while the metal is condensed not far from the furnace. An addition of pounded charcoal is advantageous. The apparatus consists either of a couple of large retorts, one inverted over and luted to the other; the under one, which contains the crude metal, being supported over the fire in a sheet iron plate; or it consists of a glass globe, half-filled with the substance, and having its orifice surmounted with a glass tube, luted to it with loam and closed at top with a plug of charcoal. The globe is sunk two-thirds into sand in a pot, resting over a fire. The arsenic is deposited upon the upper part of the glass globe, but from this being partly open to the air, octahedral crystals of arsenious acid are also formed. See *Bette* (*Ann. Pharm.*, 33, 355). In order to obtain arsenic quite free from suboxide and arsenious acid, it is to be sublimed in a wide glass tube, through which a stream of hydrogen is made to flow. Only small portions should be treated at a time, otherwise the tube may become obstructed. Small quantities of the metal are readily procured by igniting gently a mixture of arsenious acid and black flux (2,20) in a similar subliming apparatus; or by igniting arnesite of lime in a tube, through which hydrogen gas is made to pass.

Properties.—X system, 3 and 3 membered, acute rhombohedrons. Fig. 151, $r_3 . r_5 = 85° 26'$; cleavage in the direction of r and p. Besides, a more acute rhombohedron occurs, and also an obtuse one. Fig. 141, in which $r_3 : r_5 = 114° 26'$, and an angle still more obtuse. BREITHAUPT (*Pogg.* 7, 527; *Schw.* 52, 168). According to former statements, and also to Elsner (*J. Pr. Chem.* 22, 344) arsenic occurs in octahedrons; but probably they mistook for these the truncated summits of the rhombohedra (fig. 153). *

Specific Gravity.—5.6281 Karsten, 5.672 Herapath, 5.76 Lavoisier, 5.959 Guibourt, (8.31 Bergmann). Not very hard, very brittle. Tin white, passing into steel grey; strongly shining. Volatilizes, without melting, at a dull red heat. It does not volatilize in a glass tube at 294° C. (561° F.); nor even on melting zinc, but only at ignition visible in the dark. Mitchell. On trying to melt it by heating in close vessels, it bursts them, without any fusion taking place. Fischer. *Strongly poisonous.*

COMBINATIONS OF ARSENIC.

Arsenic and Oxygen.

"A. *Suboxide of Arsenic.*—Metallic arsenic in general, when exposed at the ordinary temperature to moist air, gets coated gradually with a black film, and crumbles down eventually into a black powder. Some kinds of arsenic, apparently the denser, preserve in the air their lustre and solidity, and do not increase in weight. Berzelius, Buchner (*Repert.* 21, 28), Thomson (*Ann. Phil.* 18, 130). In dry air arsenic does not change, and after it has been thus exposed for a long time, it acquires the property of resisting the influence of damp air, probably because it has become covered with some foreign substance (organic exhalations). But freshly sublimed arsenic, presented to damp air, quickly tarnishes with a bronze tint, and gets covered in a few days with suboxide. This change goes on quicker at 30° or 40° C. Entire lumps do not crumble down, but merely become coated with suboxide. The powdered arsenic is converted by water into arsenious acid. Bonsdorff.

"*Properties.*—Brown black, more volatile than arsenic, less so than arsenious acid; in the state of vapour it smells of garlic, or like phosphorus. If arsenic be heated in a tube along with air, over zinc, just solidified from fusion, a white ring of arsenious acid sublimes, and under it a brown ring of suboxide. If the tube be now plunged in boiling mercury, the white ring sublimes, but the brown ring remains till it becomes oxidized into arsenious acid, and then it volatilizes. Mitchell.

	Approximate Calculation.	
As. ...	75 ...	90.36
O. ...	8 ...	9.64
As. O...	83 ...	100.00

"The calculation is made on the fact that 100 parts of pulverized arsenic increase by eight at most in the air, according to Berzelius; according to Bonsdorff, they take eleven parts of oxygen.

"Proust regarded the suboxide as a mere mixture of metal and arsenious acid; but in this case, the oxidation of arsenic should go on to its complete conversion into arsenious acid.

"*Decompositions.*—Gently heated out of contact of air, it passes into condensable vapours of arsenious acid, and into a residuum of metal. Berzelius, Mitchell. In hot hydrochloric acid, it becomes arsenious acid, which dissolves, and metal which remains. Berzelius. In water and cold acid it is insoluble.

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* The figures of crystals are given in plates at the end of the first volume.

B. *Arsenious Acid.* $As. O_3$.

"*Arsenoxyd, White Arsenic, Flowers of Arsenic, Rat Poison, Smelting-house Fumes, Poison Flour (Meal), Arsenious Acids, Oxide of Arsenic.*

"*Formation.*—1. Arsenic heated in the air to the evaporating pitch, burns with the production of reddish garlic-smelling fumes of arsenious acid; and at a higher heat it exhibits a pale blue flame. A piece of arsenic held by tongs for a moment in a candle flame, burns some time after with a pale blueish flame; and when this ceases, it wastes away in brownish fumes, till it is almost wholly consumed. Likewise by sublimation of purified arsenic in hydrogen gas, after being kindled it continues slowly to consume. Along with arsenious acid, suboxide seems to be formed, which causes the reddish or brownish white fumes, of a garlic odour, and then these are completely changed into arsenious acid; for the vapour of pure arsenious acid affords no garlic smell, and metallic arsenic is not volatile at that moderate temperature in which the body is consumed. If burning arsenic be thrown suddenly into a glass tube, no metal is sublimed. Mitchell (*Sill. Americ. Journ.* 19, 122).—2. Covered with water, arsenic is transformed in the air at ordinary temperatures into arsenious acid. The water absorbs oxygen from the air, transfers it to the arsenic, and then dissolves the arsenious acid. If air be blown through water for fifteen or twenty minutes, in which pulverized arsenic is diffused, the presence of arsenious acid becomes manifest in the liquid, by the production of the yellow sulphuret on passing sulphuretted hydrogen through it. Orfila (*Jour. Chim. Méd.* 8, 6). When the powdered arsenic is merely moistened with water, the oxidation proceeds more rapidly. Thus we may explain the observations of Boullay (*Journ. Pharm.* 13, 433), and Schwabe (*Br. Archiv.* 11, 262), according to which a heap of about eight pounds of pulverized arsenic spontaneously took fire in the air. In Boullay's case the heat rose to combustion, and after this was quenched by moistening it with water, it burst out again after a few days in a paper packet containing the arsenic. According to Büchner (*Br. Archiv.* 19, 258), this heating occurs merely when the arsenic has been damped by trituration with water.—3. Vapours of arsenic passed through an ignited tube along with steam, afford very little hydrogen gas. Regnault (*Ann. Chim. Phys.* 62, 364.) Pure water, boiled with arsenic, dissolves some arsenious acid, while hydroguret of arsenic remains as a brown powder. Orfila.—Arsenic heated with hydrate of potash, under ignition, produces, with disengagement of hydrogen gas, arsenite of potash, and arseniuret of potassium. Sobeiran."

For further details, see under the formation of Arsenic Acid Nr. C. At common temperatures, and with exclusion of air, arsenic undergoes no change in boiled water. Bonsdorff.—4. With boiling sulphuric acid, arsenic affords arsenious acid, under disengagement of sulphurous acid, and also with dilute nitric acid under extrication of nitric oxide. Boiling concentrated hydrochloric acid disengages no hydrogen gas, and dissolves no arsenic, H. Rose, Gm. The reverse proposition is maintained by Berthollet (*Stat. Chimique*, 2, 395).

"*Fabrication.*—By roasting ores that contain arsenic in a furnace from which the fumes escape through a long horizontal tunnel, called the *poison-flue*, or into a high building called the poison-tower, which is divided into several horizontal and vertical compartments,—the poison or arsenic-flour therein sublimed, after being mixed with a little potash to retain the sulphur, is heated to the vaporizing pitch in an iron pot, to the mouth of which several iron rings are luted over each other. The greater part of the arsenious acid is condensed within the rings, at a temperature not much above its fusing point, and concretes into a vitreous mass, called white glass of arsenic. The uncondensed portion of the fumes is conducted out of the uppermost ring through a tube into a condensing chamber, where it is deposited in a powder. Some kinds of the glassy arsenic, as that of

Andreasberg, contains oxide of antimony, which is not entirely separable by sublimation along with potash, so that cold hydrochloric acid forms first, a solution that gives an orange precipitate with sulphuretted hydrogen, and afterwards a yellow one. On dissolving that glass in hot nitric acid, an arseniate of antimony is formed, which is soluble in hydrochloric or tartaric acid, and then affords all the reactions of an antimonial salt. Wiggers (*Ann. Pharm.* 41, 347).

"*Properties.*—Arsenious acid occurs in two crystalline forms, and also amorphous.

"A. *Octahedrous arsenious acid* is obtained: 1. By sublimation when the vapour is immediately so much cooled as to cause solidity without intermediate fusion. Even the poison flour belongs to this head, only it is mixed with the metal, sulphuret, and other impurities.—2. By cooling the boiling-hot solution of the acid in water.—3. By keeping the glass for a long time, whereby it passes into an opaque porcellanous condition. By 1 and 2 we obtain transparent bright shining regular octahedrons and tetrahedrons. Specific gravity of the opaque glass 3.529. Taylor (*Phil. Mag.* J. 9, 482) 3.695 Guibourt. That from the digestion of arsenic with nitric acid and washing with water, has a specific gravity of 3.7202, Karsten.

"B. *Right rhombic arsenious acid* is in a very few cases obtained by sublimation, and appears to be isomorphous with native oxide of antimony. In a cobalt-roasting furnace there sublime water-clear, pearly shining, flexible, thin, six-sided tables, easily cleavable, parallel to the main surfaces (sometimes with projecting octahedrons) and by subliming these or dissolving them in hot water, octahedrons and tetrahedrons shoot forth on cooling, free from arsenic acid. Wöhler (*Poggend.* 26, 127).

"C. *Amorphous arsenious acid.*—Fresh prepared glass of arsenic, spec. gravity 3.698 at 4° C. in a vacuum, Le Royer and Dumas; 3.7006 Karsten; 3.7385 Guibourt; 3.798 Taylor. Limpid glass of conchoidal fracture. The transparent vitreous acid becomes clouded at ordinary temperatures in a few months, then white and opaque in proportion, according to Fuchs (*Sch.* 67, 429) as it passes from the amorphous into the crystalline state. Glassy arsenic becomes equally opaque in close vessels and in the open air. At 100° C. (212° Fahr.) it passes rapidly into a state of opacity. Regnault (*Ann. Chim. Phys.* 76, 144.) On the other hand, it remains transparent for a year when kept under water, Christison (*Pogg.* 35, 494), or under spirit of wine, or in a vacuous space, H. Rose (*Pogg.* 52, 454); but under hydrochloric acid it becomes opaque. Wiggers. According to Krüger (*Karsten Archiv.* 2, 472), the glass becomes opaque only in damp air, with an increase of weight equal to $\frac{1}{160}$. If from 1 to $1\frac{1}{2}$ parts of the transparent acid be dissolved by boiling during one quarter of an hour, in a mixture of 6 parts of fuming hydrochloric acid and 2 of water, and left then to cool very slowly, the arsenious acid will begin to shoot out in transparent octahedrons, in which case the formation of each crystal is attended with a spark of light; on shaking the solution, which favours the formation of several crystals at once, a corresponding number of sparks may be perceived. If in the above portion of acid from 4 to 6 parts of the glass be dissolved, the crystallizing solution will illuminate a dark chamber. As long as crystals are produced, the solution is rendered luminous by agitation, even till the second or third evening. If the liquid be boiled, so as to occasion the remaining glass to be dissolved, the sparkling begins afresh, but weaker than before. Rapid cooling occasions the arsenious acid to precipitate in a pulverulent state, with little or no disengagement of light. Likewise, the solution of the glass in a hot mixture of hydrochloric acid, and so little nitric acid as not to convert all the arsenious into the arsenic acid, exhibits bright light. Boiling dilute sulphuric acid dissolves less arsenious acid, and shows only occasionally luminousness. Nitric and acetic acids, which dissolve still less of the arsenious, exhibit no light. Porcellanous arsenious acid, if it holds

a little of the glassy, as also the poison-meal (*giftmehl*), give, by their solution in hydrochloric acid, with agitation, very feeble luminous indications. H. Rose (*Pogg.* 35,481).

Arsenious acid by the sudden application of heat, and by increased pressure, melts into a glass. The vitreous acid fuses by heat before any considerable fumes are thrown off; the crystalline (A) appears to have a higher fusing point, and evaporates before it melts. Wöhler (*Ann. Pharm.* 41, 155). Arsenious acid does not evaporate at ordinary temperatures. Faraday (*Pogg.* 391) evaporates more readily than the metal, and according to Mitchell, even at 218° C. (424.4° Fahr.) specific gravity of the vapour 13.85. Mitscherlich. The vapour is colourless, and has no garlic odour, Scheffer, Fischer. This is perceptible on heating the acid with disoxygenating bodies, such as charcoal or iron. The solution of arsenious acid reddens litmus faintly. According to Guibourt, only a solution of the transparent acid prepared with heat and allowed to cool has that effect, and that of the opaque blues reddened litmus. But Gmelin found the latter to redden litmus feebly. Arsenious acid has first a harsh metallic taste, and then sweetish. It is one of the most violent and painful poisons.

		Thomson.	Thénard.	Davy.	Proust.	Mitscherlich.	Berzelius.	Richter.
As. 75	75.76	70.37	74.24	75	75.2	75.73	75.782	86.86
3 O. 24	24.24	29.63	25.76	25	24.8	24.27	24.218	13.14
As. O_3. 99	100.00	100.00	100.00	100	100.0	100.00	100.000	100.00

Arsenic vapour	1 vol.	Specif. grav.	10.3995
Oxygen gas	3	"	3.3279
Arsenious acid vapour ...	1	"	13.7274

As_2. O_3. = 2.470, 0 4 + 3.100 = 1240.08. Berzelius.

School Botany; *or, the Rudiments of Botanical Science. By* John Lindley, Ph.D., F.R.S., Professor of Botany in University College, London. *A New Edition, with nearly* 400 *Illustrations.* Bradbury and Evans, Whitefriars. 8vo, pp. 164.

This little work of Professor Lindley is intended to afford a rudimentary knowledge of Botany, and of the classification of the Flora of Europe, according to De Candolle's arrangement, as the first step in the study of the science.

"It contains all that it is necessary to know, in order to make a fair beginning, and it includes no more; so that if any one should have the patience to master the whole contents of the volume, he would then be in a position to carry his inquiries onwards with ease."

The characters which distinguish the principal natural orders, are illustrated by references to such plants, generally,

"As are within any man's reach; and to render the acquisition of them more easy, the vulgar names are added."

The cuts, which are numerous, are well executed, most of them have been taken by Mr. Palmer's glyphographic process, and none of those employed in the first edition are introduced in this.

We recommend this work to the notice of students entering upon their botanical studies.

We have received a copy of the *Devonport Telegraph and Plymouth Chronicle*, for April 12th, containing an Essay "on the advantages of Mechanics' Institutes," by Mr. Radford, for which a prize of £5 was awarded by judges appointed by Mr. Richard Barnet, who gave the prize. The essay is well written, and evinces an acquaintance with the subject, as well as enthusiasm in the cause of science. We are glad of the opportunity of noticing this essay, as the author is an Assistant in a Chemist's shop, and an Associate of the Pharmaceutical Society. It shows the result of application to scientific pursuits under the disadvantages of long hours of business.

TO CORRESPONDENTS.

W. H.—The gas which is disengaged on mixing liquor ammoniæ acetatis with spiritus ætheris nitrici, is carbonic acid, with probably a little atmospheric air, these being held in solution in the liquor ammoniæ acetatis, and disengaged by the spirit. It might also arise from the *liquor* being alkaline and the *spiritus* acid.

A. P. S. (Canterbury).—Pills may be covered with gelatine by fixing them on wire points, and dipping them for a moment in a warm solution of it.

C., A. P. S.—(1.) We have already stated that Essence of Musk may be made by macerating musk in proof spirit. The proportions are arbitrary, but the most important part of the process consists in obtaining good musk.—(2.) For cleaning kid gloves a paste made of white soap and water answers very well. It may be applied with a piece of flannel. It is sold in Paris in pots under the name of "Saponine."—(3.) We are not acquainted with any recent botanical work which would replace *Hooker's British Flora*, now out of print. The natural system is now generally adopted.

A. P. S. (Leicester).—(1.) Tinct. Chirayta: ℞ Chiraytæ ℥ij.—Sp. Ven. Ten. ℥xvj. Macera s. a.—(2.) Genuine cod liver oil may be had of Mr. Beasley, Uxbridge.

G. H. W.—The discrepancies in the work alluded to must be accidental. The terms *iridiæ* and *iridaciæ* are synonymous, the former being adopted by Jussieu and the latter by Lindley.

An Apprentice (Piccadilly).—(1.) We presume that the bubbles of air observed on rubbing together balsam of copaiba and castor oil consist of atmospheric air.—(2.) When magnesia is added to compound infusion of roses, it combines with the sulphuric acid, and if there be an excess of magnesia the colour is changed to green.

"A Member" (City).—We are acquainted with no means of entirely removing the odour from cocoa-nut oil.

"Block."—For a formula for Ginger Beer, *see* vol. ii., page 778.

A. P. S. (Cheltenham.)—For the mode of preparing bisulphuret of carbon, see any Manual of Chemistry.

M. L. O. (Coggeshall.)—In vol. iii., page 508, we published a good formula for writing ink on the authority of Dr. Ure. It is possible that some makers of ink may have improved upon this formula, but they do not reveal the secrets of their trade.

M. P. S. (Gloucester)—The Act prohibiting the sale of drugs to brewers contemplates merely the prevention of their use in the making of beer, and we apprehend that a conviction could not take place unless it could be proved that the person selling the drugs knew or suspected that they were required for an illegal purpose.

"Cleveland."—Syrupus Rhei: ℞ Rad. Rhei ℥ijss.—Fol. Sennæ ℥ijss.—Sem. Coriand. Contus. ℥ijss.—Aquæ ferventis Oij.—Macera per horas sex et adde Sacchari, ℔ iv ℥xij. Coque per sextam horæ partem, et cola.

F. R.—(1.) Effervescing Magnesia is generally made by mixing carbonate of magnesia with sesquicarbonate of soda and tartaric acid, with sometimes a little sugar.—(2.) Tincture of bark, in common with other tinctures, throws down a deposit by keeping, the precise nature of which has not been fully investigated.—(3.) We are unable to state what is the best remedy for mildew in silk.

Mr. Wootton need only refer to the description of the process of displacement, vol. i., pages 61 and 591, and he will perceive that his objection is groundless.

"An Associate" (Strand).—Probably the solution alluded to may be made with oxide of silver and cyanide of potassium.

S. J. E.—Vinum Antim. Tart. should not be filtered through magnesia, as alkalies have a tendency to decompose the salt, throwing down oxide of antimony.

J. H * * *.—(1.) Nitrous oxide gas is obtained by exposing nitrate of ammonia in a retort to the heat of a lamp, and collecting the gas which is disengaged.—(2.) The process by which iodide of nitrogen is formed is given in every work on systematic chemistry; but it is too dangerous a substance to be made by the inexperienced.—(3.) A patent has been recently taken out for converting sulphate of manganese into peroxide; but with this exception, there is no economical method known.—(4.) Our Correspondent should refer on such subjects to any Manual of Chemistry.

X. Z.—Sulphur is perfectly fluid at a temperature of about 226° Fahr.

"A Member."—Decoction of galls may be made by boiling ℥ss. of galls in Ojss. of water, down to Oj.

"Tyro."—(1.) The mixture remaining in the retort after the distillation of spiritus etheris nitrici, contains several products, which vary according to the circumstances under which the operation has been conducted, and do not admit of being turned to any useful account.—(2.) *Sal polychrest* is sulphate of potash; *Sal enixum*, bisulphate of potash; and *Sal diureticus*, acetate of potash.—(3.) The "characters of good simple extract of sarsaparilla," are that it shall form a clear solution in water, and that this solution shall possess the properties of the simple decoction of sarsaparilla.—(4.) There is a difference in the expansion by heat of water and of spirit. See any Manual of Chemistry.—(5.) See *Phillips's Translation of the Pharmacopœia*.—(6.) $C_2\ N_2\ H_4\ O_2 = NH^3, C_2\ NO, HO$.—signifies that urea contains the elements of cyanate of ammonia with one atom of water.

W. H. (Bristol).—The pressure of the atmosphere is equal to about 15 pounds to the square inch; the pressure of 40 atmospheres, is, therefore, 40 times 15=600 pounds to the square inch.

J. B. (Newark).—Arsenic may be detected in tallow by boiling the tallow in dilute hydrochloric acid, and then testing the solution.

"An Apprentice" (Essex).—Tinctura Imperatoriæ: ℞ Radicis Imperatoriæ ℥ij.—Sp. Vini Ten. ℥xvj. Macera s. a. Imperatoria (*Masterwort*) is not much used in medicine. Its root is acrid and bitter, and has been recommended as a febrifuge, and also as a remedy for toothache.

H. C. inquires whether the following mixture should be clear or turbid? ℞ Tinct. Cinchonæ ℥j.—Tinct. Sennæ Co. ℥ss.—Liq. Potassæ ℥ss. M. [It is turbid.]

"X. Y." is anxious to know whether the sale of spirit of wine to hydropathic physicians "for the purpose of sweating patients when the wet sheet fails" is an infringement of the Excise Law? [We imagine that this would be considered a medicinal purpose. See page 494.]

C. A. D.—(1.) Starch is converted into dextrine by the action of diluted sulphuric acid, and by heat.—(2.) The *Journal de Pharmacie* is published by Fortin, Masson, & Co., Paris; and may be obtained of Bailliere, Regent Street; or Dulau & Co., Soho Square, London.

Mr. Edward.—(1.) *Phillips's Translation of the London Pharmacopœia.*—(2.) A knowledge of the symbols and equivalent numbers is not absolutely required in the examinations at present.—(3.) The Board of Examiners does not meet in September.—(4.) At present no fees are exacted on passing an examination.

"A Well-Wisher" gives the following formula for Red Sealing Wax: ℞ Shellac ℥x.—Resinæ Flavæ ℥vj.—Ol. Terebinth. ℥ij.—Hydrarg. Bisulphureti ℥jss.—Cretæ ppt. ℥ss. For Black Sealing Wax substitute lamp black for vermilion. The other subject should be mentioned officially to the Secretary of the Society, who would take the needful steps on receiving a letter.

"An Associate" (Preston).—*See* vol. ii., No. 8.

T. A. S.—The Medical Bill now before the House, will alter the arrangements respecting education.

"Botanicus."—A general knowledge of botany should be acquired by candidates who present themselves for examination as Associates or Members. This implies the ability to recognise the plants in ordinary use in medicine, either from plates or specimens.

Several Correspondents have written respecting the importance of legislation in Pharmacy, as a means of preventing the fatal accidents arising from ignorance in those who dispense medicine. We think the progress of events is gradually tending to this result.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to The Editor, 338, Oxford Street, before the 20th of the month.

THE PHARMACEUTICAL JOURNAL.

VOL. IV.—No. XII.—JUNE 1st, 1845.

SERIOUS ALTERATIONS IN THE MEDICAL BILL.

We observe with much regret that a fresh obstacle has arisen to the amicable arrangement which last month appeared likely to take place between the contending parties in the profession.

On the 6th of April, a large meeting of the National Association of General Practitioners was held at the Hanover Square Rooms, on which occasion Mr. Wakley proposed to take the sense of the Members on the question, Whether it would be expedient to direct the powers of the Association towards the enfranchisement of the General Practitioners in the College of Surgeons, or to obtain a separate corporation? The Committee replied that they had already settled that question; and that "from the very first step taken by them up to that instant, it had been their intention to obtain a separate corporation." This announcement led to a very stormy discussion, and eventually the resolution of the Committee was carried by a large majority.

On the following day, Sir James Graham introduced to the notice of the House of Commons the alterations which he proposed to make in the Medical Bill. He announced with regret that he no longer entertained any hope of effecting a reconciliation between the governing body in the College of Surgeons, and the great body of General Practitioners; and he had therefore determined to accede to the desire, which had been very generally expressed, for a separate corporation. He was decidedly opposed to the extension of the representative power to all the licentiates of the College of Surgeons, observing, that this would soon be the means of reflecting the character of Apothecaries' Hall upon the College, which would be a degradation of the science of Surgery, and a misfortune to the profession and the public. The General Practitioners would not be satisfied with any arrangement which

did not give all their members this representative privilege; and as this could not be complied with in reference to the College of Surgeons, he had no alternative but that of granting the separate incorporation for which they had applied.

There would then be three distinct incorporations, one of Physicians, one of Surgeons, and one of General Practitioners. He proposed to constitute a Board of Twelve Examiners, consisting of six Physicians appointed by the College of Physicians, and six Surgeons appointed by the College of Surgeons. This Board, in conjunction with the Council of Health, would decide upon the merits of all candidates entering the profession, such candidates having attained the age of twenty-two. There would thus be one portal alone through which all must enter.

Those candidates who desired to embark in General Practice, having obtained a *liceat* from the above Board, would present themselves for examination to another Board, consisting of General Practitioners, and appointed by the New College. Those who desired to practise as Physicians would, after having attained the age of twenty-six, present themselves to the College of Physicians, and those who wished to practise as Surgeons, to the College of Surgeons.

The Apothecaries' Act of 1815 would be repealed, but the power of prosecution given to the Apothecaries' Company by that Act, would be transferred to the New College. Sir James Graham stated, that the Apothecaries' Company had, in the most handsome manner, consented to the above arrangement, and had declared its willingness to surrender all its existing powers.

Two General Practitioners, appointed by the Council of the College, should be members of the Council of Health. The University of London would also be represented in that Council. These were the most material alterations contemplated in the Medical Bill.

Mr. Wakley expressed great dissatisfaction at the proposed alterations, which he considered injurious and degrading to the great body of the profession. Some discussion ensued, in which

Sir James Graham and Mr. Wakley took a prominent part, and the recommittal of the Bill was fixed for the 9th of June.

We have frequently had occasion to remind our readers of the necessity of watching the progress of the Medical Bill, lest any objectionable alterations should be made in it in Committee. The same idea is also thrown out in the Report of the Council (page 548), which was drawn up before the last edition of the Bill was published. We were therefore quite prepared for the reception of the clause, which was discussed at the Annual Meeting, and are prepared to show that such a clause, if passed into a law, would occasion the ruin of every Chemist in the kingdom, and inflict great injury on the Public.

By the clause in question it is proposed to be enacted—

"That every person who, after the passing of this Act, shall act or practice as an Apothecary, in any part of England or Wales, without having been registered by the said Council of Health as a General Practitioner in Medicine, Surgery, and Midwifery, shall for every such offence forfeit and pay the sum of twenty pounds, to be applied to the use of the said College of General Practitioners in Medicine, Surgery, and Midwifery, and to be recovered by the said College by action of debt in any of Her Majesty's Courts of Record in Westminster."

The operation of this clause hinges upon the definition of the term "practising as an Apothecary," and this opens a wide field for litigation, persecution, and injustice. In fact, the New College would require no other funds for its support than the fines which would daily be levied on Chemists and Druggists throughout the country, in the most summary manner, without any hope of mitigation, or chance of redress.

In every case of emergency in which, in the absence of medical aid, a Chemist endeavoured to afford temporary relief, he would be liable to a penalty of £20. Whenever a poor person, suffering from headache, indigestion, a slight bruise or cut, or any other ailment of the most trifling description, and not possessing the means of obtaining medical aid, applied to a Chemist, the administration of a pill, or a dose of rhubarb, or the application of

a piece of adhesive plaster, might be construed into "practising as an Apothecary," and a penalty of £20 might be recovered. It might even be questioned whether the compounding of prescriptions did not come within the definition, this having been originally the legitimate and sole office of the Apothecary.

A penalty of this description, recoverable by so summary a process, depending on the arbitrary interpretation of a very indefinite term, and inflicted by the parties who pocket the spoil, would within one year provide the New College with immense wealth, and drive the Chemists from the field. Suppose a Chemist to be fined only once a day (and he might be fined twenty times), a few months would complete his ruin, and it would be more prudent to retire at once from business, than to struggle for a week against the persecution which would be legalized, if such an act were to pass.

When we consider the nature and principles of the Medical Bill, as it was constructed a month ago, it is surprising that a clause so diametrically opposed to those principles, should have gained admission under any circumstances; and it is obvious, that it has been introduced at the instigation of interested parties, for the express purpose of restraining the Chemists.

From the time that the PHARMACEUTICAL SOCIETY was established, it has been the object of the Council to abstain altogether from political controversy, and to overcome the jealousy which previously existed between Apothecaries and Chemists, by directing the attention of their own body to education and scientific improvement, and by inculcating the advantage of reciprocal forbearance and honourable conduct. The Society has uniformly discouraged medical practice among its Members, and has frequently and openly avowed that the object of the Institution is to raise the character and improve the condition of our body, by the advancement of Pharmacy, and the establishment of a proper system of education in that branch of the profession.

It is admitted by all reasonable men that it is extremely difficult, if not impossible, to define by law the boundary line between the

province of an Apothecary and that of a Chemist. It is admitted that whatever encroachments are made by the latter class, prevail chiefly among those whose standing and qualifications are not of the highest order, and that the most respectable Chemists, although they are obliged sometimes on an emergency to administer a simple remedy, trespass no more on the province of the Medical Practitioner, than the demands of the public *absolutely require.* In proportion to the advancement of education in Pharmacy and Chemistry, the tendency to irregular medical practice must of necessity diminish, and nothing is more calculated to assist in this result than the encouragement of harmony and mutual confidence between the parties.

This object the Council have had in view, and we feel convinced that the course the Society has adopted, is the proper and legitimate means of effecting the reformation.

The attempt to introduce into an Act of Parliament a clause like the one above quoted, is impolitic, and unworthy of the members of an honourable profession. It is not to be supposed that the Chemists or the public would allow it to pass. The Medical Bill in its present form is an impracticable measure, and is so entirely changed in its character since the first reading, that it may be considered an entirely new bill. If it were possible for such a bill to pass, the Colleges of Physicians and Surgeons would cease to hold their present position, the Chemists would become extinct, and the new College of General Practitioners would swamp the profession.

And what will the General Practitioners gain by their new College? They will enjoy the privilege of inscribing their names with the epithet F.R.C.G.P.; but any "Fellow of the said College," who shall presume to call himself "A SURGEON," will be "deemed guilty of a misdemeanour in England and Ireland; and, in Scotland, of a crime and offence, and being convicted thereof, shall be punished by fine or imprisonment, or both, as the Court, before which he shall be convicted, shall award."

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ABSTRACT OF A LECTURE
ON THE NATURE AND PROPERTIES OF THE ACTIVE PRINCIPLES OF VEGETABLES.

BY ALFRED B. GARROD, M.D.,
Physician to the Fore Street Dispensary.
Lecturer on Materia Medica and Therapeutics at the Aldersgate Street School of Medicine.

The lecturer commenced by comparing the composition of bodies from the organic with those from the inorganic kingdoms, showing that in the latter the number of elements is very numerous, and their arrangement very simple, and that in general they possessed great stability; but that in the former, the elements entering into their composition were few in number, not more than six in all; viz., carbon, hydrogen, nitrogen, oxygen, sulphur, and phosphorus; but that these few elements were capable of an almost infinite variety of combinations; each combination forming a distinct compound; he stated that an organic compound might in 100 parts have the same composition with another compound, but that each atom or equivalent might have a different weight: also that two bodies might have the same composition in 100 parts, and the atom or equivalent of both compounds might also be equal, the difference in the nature of the compounds arising from the arrangement of the elements in the one being different from those in the other. As an example of this fact, the *acetate of nethyle*, and the *formiate of ethyle* were compared; the formula represented the atom of each, being $C_6 H_6 O_4$. But the probable arrangement of these elements in the first, is *oxide of nethyle* $C_2 H_3 O$ + *acetic acid* $C_4 H_3 O_3$; in the second compound, *ether* $C_4 H_5 O$ + *formic acid* $C_2 H_1 O_3$. Decomposition by *potash* proved the different arrangement of the elements, the first compound being resolved into wood spirit and acetate of potassa, the second into alcohol and formiate of potassa. Organic compounds in general are much less stable than inorganic, small disturbing forces breaking them up into simpler compounds, until at last they become resolved into carbonic acid, water, ammonia, &c.

The lecturer then proceeded to show that vegetable principles might be divided into those which were essential to plants, and those which were non-essential, the first class including the

albuminous nutritive principles, as albumen, fibrin, ligumin, &c.; also the amylaceous group, as lignin, starch, sugar, gum, and the fixed fatty substances; the second or non-essential class, including the vegetable alkaloids, acids, and neutral principles. The first class of principles are chiefly employed as the food of animals, the nitrogenised principles having a composition identical with the blood and flesh of animals, and the amylaceous principles, &c., serving for respiration, animal heat, and for the formation of fat. The principles contained in the second class do not serve as food, and in general exert a powerful influence over the animal economy, and frequently produce poisonous effects. The formation of these principles in the vegetable kingdom is much influenced by the age of the plant, season of year, and also by the presence of light, many plants forming poisonous principles when exposed to light, yet when grown in the shade, are perfectly inert. Again, these principles are usually found in some parts of the plants, in preference to others, some chiefly in the bark, others in the seeds or roots, &c.

The lecturer then proceeded to describe the active principles of vegetables, dividing them into three classes: first, those possessing alkaline properties; second, those neutral in their reactions; and third, the vegetable acids.

The first class, or vegeto alkalies or alkaloids, form the most active class of vegetable principles. All possess nitrogen in their composition, and therefore evolve ammonia when heated to destruction. They all unite with acids, and form salts, the composition of which is easily understood if we compare the alkaloids with ammonia ($N H_3$) for ammonia is the true type of the vegeto-alkalies, and as ammonia when it forms salts always holds an atom of water attached to it, so also do the vegeto-alkalies; and again, as ammonia when brought into contact with the hydracids form compounds directly with them, without the separation of the hydrogen of the hydracid, so also do the vegeto-alkalies. This can easily be made intelligible if we suppose a body ($N H_4$) which is called ammonium, to exist in the salts of ammonia, and then a salt of ammonia, as the sulphate, instead of being represented by the formula $N H_3 H O, S O_3$, can be thus represented $N H_4 O, S O_3$ and in the same way, the salt with an hydracid as the hydrochloric, instead of $N H_3 H Cl$ can be represented by $N H_4 Cl$. The same applies to the vegetable alkaloids, and we must suppose that in the salts, the alkaloids unites with an atom of hydrogen, and that with this addition it becomes a basyle, as ammonium, potassium, &c. The alkaloids also form double salts with the bichloride of platinum in the same way that ammonia does.

Most of the alkaloids are solid and fixed, but some few, as

conia and nicotina, are fluid and volatile. Most are crystallizable, but some can only be procured in an amorphous form. In general they are but little soluble in water, but soluble in alcohol and ether: their solutions give an alkaline reaction to test paper, and generally are very bitter. Their salts are usually more soluble than the alkaloids themselves, but most of them are precipitated by tannic acid. In the plants they exist in the form of salts, usually combined with some vegetable acid. The lecturer then proceeded to explain the principles upon which their mode of extraction depended—the alkaloids, which are fluid and volatile, requiring a different mode of proceeding to those which are solid and fixed. Next the different alkaloids were compared, and their relations and differences pointed out. Most of them act powerfully on the system. Those alkaloids from the same or allied natural orders of plants in general exert an action on the system which is very similar, the difference being usually more in degree than in character, as between quina and cinchona, morphia and codeia, &c., but when derived from different natural orders, their action on the system is usually of a totally different character, as between morphia, strychnia, &c. The lecturer then proceeded to speak of the principal alkaloids, their properties, composition, and the plants from which they were derived.

The neutral vegetable principles were next spoken of, and subdivided into two classes, viz., those which contain nitrogen, and those devoid of that element. Those of the first class approach very much to the alkaloids in their properties, and some can scarcely be distinguished from those bodies, but their solutions do not give an alkaline reaction to test paper, nor do they saturate acids, although most of them combine and form crystallizable salts with some of the acids. The principal are narcotina from opium, piperina from peppers, caffeine or theine from tea and coffee, &c., theobromine from cocoa, the composition of which we have given in a table.

The principles not possessing nitrogen act in general but feebly on the system, and do not possess very remarkable properties, such are silicine, columbine, smilacine, &c.

The lecturer next took a survey of the composition of the volatile oils, showing how simple they were in composition, and that most of them were formed on one type, which might be represented by (C_5 H_4). That many were identical in composition in 100 parts, yet that their equivalents were different, thus oil of turpentine can be represented by C_{20} H_{16} or 4 (C_5 H_4), because it forms a solid compound with hydrochloric acid C_{20} H_{16}, H Cl, and oils of lemon can be represented by the formula C_{10} H_8 or 2 C_5 H_4 for it forms with hydrochloric acid a

compound $C_{10} H_8$, H Cl, so also will oil of copaiba, oils of juniper and savin, the atom of the oil of pepper and cubebs is also some multiple of ($C_5 H_4$). Some volatile oils may be represented by a multiple of ($C_5 H_4$) with an addition of water. Thus oil of bergamot has the composition 6 $C_5 H_4$ + 2 H O. Others can be represented as oxides of the type ($C_5 H_4$) as camphor, whose formula is $C_{20} H_{16} O_2$. Some of the essential oils cannot be referred to this type, but probably their constitution is equally simple.

The last class of bodies to which the lecturer alluded, were the vegetable acids: these he compared with the inorganic acids, and showed their relations and differences, and stated that in the inorganic kingdom an acid existed, which in its properties approached very near to the organic acids, and was as it were a link connecting the two classes; this acid is the phosphoric acid, which in different conditions exhibits the properties of a monobasic, bibasic, and tribasic acid. The lecturer concluded by speaking of the composition and properties of the chief vegetable acids, and the plants in which they were found.

The following is a list of the composition of some of the chief vegetable principles.

TABLE containing the Names and Composition of the chief vegetable principles.

Cinchonia ...	$C_{20} H_{12} N_1 O_1$	Caffeine and Theine ...	$C_8 H_5 N_2 O_2$
Quina	$C_{20} H_{12} N O_2$	Asparagine...	$C_8 H_8 N_2 O_6 + 2 H O$
Aricina	$C_{20} H_{12} N O_3$	Emetina	$C_{37} H_{27} N_1 O_{10}$
Stychnia ...	$C_{44} H_{23} N_2 O_4$	Amygdaline	$C_{40} H_{27} N_1 O_{11}$
Brucia	$C_{44} H_{23} N_2 O_5 + 2$ HO	Oxalic acid	H O, $C_2 O_3 + 2 H O$
Codeia	$C_{35} H_{20} N O_5$	Tartaric acid	2 H O, $C_8 H_4 O_{10}$
Morphia.....	$C_{35} H_{20} N O_6$	Citric acid ...	3 H O, $C_{12} H_5 O_{11}$
Thebaia	$C_{25} H_{14} N O_3$	Aconitic acid	H O, $C_4 H_1 O_3$
Narcotine ...	$C_{40} H_{20} N O_{12}$	Malic acid ...	2 H O, $C_8 H_4 O_8$
Narceine.....	$C_{32} H_{24} N_1 O_{16}$ (?)	Tannic acid	3 H O, $C_{18} H_5 O_9$
Chelidonine	$C_{40} H_{20} N_3 O_6$	Gallic acid ...	3 H O, $C_7 H_1 O_3$
Nicotina	$C_{10} H_8 N_1$	Kinic acid ...	2 H O, $C_7 H_4 O_4$
Atropia	$C_{34} H_{23} N_1 O_6$	Meconic acid	3 H O, $C_{14} H_1 O_{11}$
Solania	$C_{84} H_{68} N_1 O_{28}$	Benzoic acid	H O, $C_{14} H_5 O_3$
Conia	$C_{12} H_{14} N_1 O_1$ (?)	Cinnamic acid	H O, $C_{18} H_7 O_3$
Veratria.....	$C_{68} H_{45} N_2 O_{12}$	Acetic acid	H O, $C_4 H_3 O_3$
Piperine.....	$C_{34} H_{19} N_1 O_6$	Ulmic acid ...	$C_{40} H_{12} O_{12}$
Theobromine	$C_9 H_5 N_3 O_2$		

FOURTH ANNIVERSARY
OF
THE PHARMACEUTICAL SOCIETY,

Held at 17, *Bloomsbury Square, May* 20*th*, 1845,

MR. T. N. R. MORSON, VICE-PRESIDENT, IN THE CHAIR.

THE Chairman said he held in his hand a letter from the President, expressing his regret that important business prevented his taking the chair on that occasion, and it therefore became his duty, as Vice-President, to bring before them the business of the day.

At the previous Anniversary Meeting they were deprived of the presence of their President, Mr. Payne, who was then on a bed of sickness, from which he was destined to be removed to the grave. This melancholy event had deprived the Society of his advice and assistance; the former of great value, and the latter unsparingly given, even to the sacrifice of his health. They were most of them aware of the clear and distinct views which their late President entertained of the utility of this Institution, and of his unbounded zeal in promoting its interests, which he justly considered as the interests of the whole body. It had been Mr. Payne's earnest and constant desire that the less fortunate among them should receive all possible attention, and that one of our chief objects should be the improvement of their condition by the extension of knowledge. He, the Chairman, felt that he expressed the sentiment of every member of the Council, who had had the pleasure of working with Mr. Payne, when he stated that the loss they had experienced in his death was one which it was no easy matter to supply.

He would now call upon the Secretary to read

THE REPORT.

THIS Society has now reached its Fourth Anniversary, and the Council trust that the very favourable Report they are enabled to present will give general satisfaction.

The progress made by the Society in carrying out the various objects proposed at its formation, relative more especially to educational objects, fully justifies the Council in stating, that it is now in a condition to undertake and promote the professional education of its Associates, as well as advance the science it professes to teach; and is prepared, in the event of Legislative enactment, to take upon itself, with advantage and protection to the public, the regulation of this branch of the profession, and thus raise the character of British Pharmacy to its proper standard.

FINANCIAL REPORT.

RECEIPTS AND EXPENDITURE FROM JAN. 1st TO DEC. 31st, 1844.

Dr.

	£	s.	d.
Six Life Members 126 0 0			
Interest on Stock.. 14 8 2			
	140	8	2
Benevolent Fund Donations 41 10 0			
Interest on Stock .. 40 2 10			
	81	12	10
Interest on Druggists' Old Fund	39	6	0
Interest on General Stock....	186	17	10
Interest on Exchequer Bills..	0	15	8
Rent of Chambers	20	4	0
Fees for Attendance on Lectures	138	1	6
1542 Members 3238 4 0			
Less carried to Life Members 15 15 0			
	3222	9	0
Three Composition Members..	3	3	0
Members' Entrance Fees	79	16	0
1584 Associates.... 1663 4 0			
14 Less, become Members .. 14 14 0			
1570 Associates.....	1648	10	0
92 Registered Apprentices....	96	12	0
Registration Fees	22	18	0
Subscriptions for 1843	21	0	0
Balance due to Treasurer....	681	9	3
	£6383	3	3

Cr.

	£	s.	d.
Balance due to Treasurer, 1843 .	1351	15	11
Investment of Life Members' Subscriptions, and Dividend, 3 per Cent. Con., £117 18s. 9d. Stock, cost	117	12	10
Investment on account of Benevolent Fund, 3 per Cent. Consols, £611 14s. Stock, cost	608	17	8
Investment on account of Druggists' Old Fund, 3¼ per Cents., £29 12s. 10d. Stock, cost ..	30	12	10
Law Expenses and Herald's College Fees	135	6	4
Pharmaceutical Journal 1162	10	0	
Delivering ditto	84	12	4
Library	94	15	3
Museum	438	12	10
Curator and Librarian	107	10	0
Apparatus	32	0	6
Expenses of Lectures 646	15	11	
Fixtures & Fittings, Laboratory	391	8	9
Furniture	48	11	10
Advances to Branch Schools ..	90	5	0
Travelling Expenses of Country Members of Council	55	5	0
Rent 240 0 0			
Rates and Taxes.... 84 19 9			
	324	19	9
House Expenses.	72	6	0
Secretary	152	17	8
Collector's Poundage	61	15	0
Country Commission on Remittances	1	18	4
Servants' Wages.....	136	5	6
Treasurer's Clerk	5	5	0
Accountant (three years)	15	0	0
Stationery.....	33	6	7
Postage	31	0	4
Advertisements	17	4	6
Printing and Engraving	120	2	0
Sundries, Light Gold	3	8	1
Subscriptions returned.....	10	1	6
Cash in Secretary's hand.....	1	0	0
	£6383	3	3

We, the undersigned Auditors, have examined the Accounts of the PHARMACEUTICAL SOCIETY, and find them correct, agreeably with the foregoing Statement, and that there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st December, 1844,

	£	s.	d.
On Account of the General Fund .....3¼ per Cents. reduced..	5500	0	0
Benevolent Fund.....3 per Cent. Consols....	1941	13	8
Druggists' Old Fund, New 3¼ per Cents.....	931	7	5
Life Members Fund, 3 per Cent. Consols. ...	552	1	9

WILLIAM HOOPER.
JOHN WYMAN.
ROGER SWIRE.
WILLIAM M'CULLOCH.

April 14th, 1845.

THE SCHOOL OF PHARMACY.

One of the most important progressive steps in this department, has been the establishment during the past year of a Laboratory for Practical Instruction in Pharmaceutical Chemistry, which the Council are happy to state has proved most successful, considering the limited scale on which it has yet been carried out; and they consider it their duty to recommend the appropriation of a further amount of capital to this important part of the Educational objects of the Society, having every reason to believe, that if properly organised, it will not only greatly benefit such Pupils as may be enabled to attend, but also prove a source of profit, rather than expense to the Society, and place it in a proper position to claim legislative protection.

They also desire to draw special attention to the obvious necessity of Pupils, at the expiration of their apprenticeship, devoting some months to Lectures and Practical Manipulations, by which the active business-operations of their future lives may be rendered more useful to themselves and others, by giving to the Pharmaceutical Chemist such a professional education and knowledge, as may justly entitle him to the confidence of the public.

The only alteration in the Lectures has been the augmentation of the Chemical course, which has also been divided into two parts, Organic Chemistry being now a summer course; the rising importance of this department of the science rendering it worthy of special attention.

The attendance on Lectures, although as numerous as heretofore, has scarcely equalled the expectations and earnest wishes of the Council, considering the small fee required for admission. Although this department is attended with considerable expense, they have not considered it desirable to augment the fees, wishing to give every encouragement to Apprentices and Pupils to attend the Lectures. They hope, in this respect, to be seconded by Members impressing on their young men the necessity of study, and the advantages afforded by the School of Pharmacy.

The Council considering the importance of endeavouring to add to our stock of knowledge, have recently established a

SCIENTIFIC COMMITTEE,

Having for its object the investigation of the Natural History and Properties of substances and products comprised in the Materia Medica, respecting which the information already possessed is imperfect; and they feel gratified in having secured in aid of their object, the assistance and co-operation of several gentlemen distinguished for their knowledge of these subjects, who have kindly formed part of the Committee.

THE EVENING MEETINGS AND LECTURES

Have continued to attract a fair attendance, and it is presumed will acquire additional interest from the result of the labours of the Scientific Committee.

THE LIBRARY AND MUSEUM.

These departments of the institution have made favourable progress during the past year. Some additions have been made to the Library by the purchase of standard works, and by a few donations. The Museum is already in a very forward state, and it is admitted, will bear comparison with any Museum of the kind in Europe. It is more remarkable for the quality of its specimens than for the extent of the collection, and the Council have made arrangements for enlarging it as the supply of specimens increases. In this object they hope the liberality of the Members will be continued.

THE EXAMINATIONS.

The Examiners have attended monthly as usual; and it is with pleasure they report favourably of the extent of knowledge evinced by several of the candidates who have studied for the purpose. They also view with great satisfaction the numerous registrations of Apprentices, showing the increasing confidence of the public in the present and future utility of the Institution.

REDUCTION OF THE SUBSCRIPTIONS.

At the time the Society was formed, it was found extremely difficult to arrive at any decision likely to give general satisfaction respecting the manner in which it was to be supported. After mature deliberation, the result was the conviction on the part of the Council that the amount of subscription then decided upon would be adequate to the wants of the Society, and proportionate with the advantages which it was anticipated would ultimately arise from its establishment. This opinion has been entertained by the Council of each succeeding year up to the present time, and although it was always contemplated that a reduction would at some period be found desirable, the Council have considered this too serious and important a step to be hastily adopted, and were desirous of deferring it until the financial position of the Society was sufficiently advanced to remove all doubt upon the subject.

When the excitement and fear of extraneous legislative subjection had in some degree subsided, it appeared that a majority of the Society were in favour of the change. The Secretaries in several populous and influential districts expressed a conviction that the reduction in the terms of subscription would

be followed by a considerable accession of numbers, and pledged themselves to use their influence in promoting this result. It was stated by many Members as their decided opinion, that this measure, instead of diminishing the resources of the Society, would materially increase them, and at the same time extend the influence of the institution, by securing the co-operation of new supporters.

Although the Council were less sanguine on this subject than some of their correspondents, they felt bound to act upon the urgent and general appeal which had been made, and accordingly, after much deliberation, the proposition was carried.

It would be premature to give a decided opinion or statement as to the result of this measure, but the Council have reason to believe that it has been satisfactory to the majority of the Society, and they are aware that many Members and Associates are now on the list who would not otherwise have contributed their support.

At the same time the Council anticipate that the present income of the Society will be found not more than sufficient to defray its current expenses, and consequently the prospect of speedily accumulating a fund for the relief of the unfortunate, as well as funds for other contingencies, must depend upon the future accession of numbers, which there is reason to hope will take place as the influence of the Society increases.

If this hope should be realized to such an extent as to bring the income to nearly what it was before the subscription was reduced, the change will prove decidedly beneficial, it having been the object of the Society to embrace in one Institution the whole body of qualified Chemists in the country.

BENEVOLENT FUND.

The Council regret they cannot recommend any further grant to this fund, until the result of the reduction of the subscription be fully manifested, more especially as they consider it advisable, without delay, to forward by some outlay the Educational objects of the Society; but they do not lose sight of the importance of this department, and record with satisfaction several voluntary donations. Many Members and Associates have contributed to this fund that portion of their subscriptions which had been remitted, and the Council again appeal to those who have the means of contributing.

THE TRANSACTIONS.

At the time that the reduction of the Subscription was in contemplation, the question was seriously considered, whether, with the reduced income, it would be practicable to continue the

gratuitous distribution of the PHARMACEUTICAL JOURNAL to the Members and Associates. The Council were anxious if possible to make no alteration in this respect, being convinced that the periodical circulation of Transactions has hitherto been attended with many advantages; that it tends to increase the harmony existing in the Society, and at the same time to promote the desire for information, especially among the junior readers. Some arrangements having been made by which the expense of publication has been diminished, and a careful calculation of the total expenditure of the Society having shown that the income was likely to be adequate to this outlay, the Council decided in favour of continuing the distribution of the Journal as before.

THE BYE-LAWS

Have been revised in conformity with the Charter, and in some respects modified. They will shortly be printed, and may be had by any member desiring them.

THE MEDICAL BILL.

The Council have carefully examined the Bill now before Parliament, and have taken legal advice upon the subject. Although the Bill in its present form makes no allusion to Pharmacy, and does not directly interfere with the interests of Chemists and Druggists, it is necessary to watch its progress in order to prevent, if possible, any objectionable alterations, and also to secure to the Pharmaceutical department such legislation as may be desirable. This omission in the Medical Bill would have been a serious defect, if it had not been understood that a supplementary measure was in contemplation for the regulation of Pharmacy, and at this important crisis it is the duty of all the Members of our body to unite their influence in maintaining their just rights and privileges, and securing their proper position as a branch of the Medical Profession.

The Council have been in communication with Sir James Graham, and have been informed that the subject of Pharmacy cannot be entertained until the Medical Bill has been passed. It will therefore become the duty of the future Council, when the proper time arrives, to renew the exertions which are now suspended. There has never been a time in which unity among our Members was more essential than it is at present. The progress which the PHARMACEUTICAL SOCIETY has made, the system of education which it has established, and the scientific position which it has taken, have given to the Pharmaceutical Chemists of this country an amount of influence which they did not previously enjoy, and the time will soon arrive when this

influence may be successfully exerted in obtaining the objects for which the Association was originally formed. The Council therefore trust, that such Members of our Profession as have not yet joined our body, will feel the advantage and utility of so doing.

The CHAIRMAN thought it desirable, before they entered upon the consideration of the Report which had just been read, that he should advert to one or two points connected with subjects alluded to therein. The rise of that Society had afforded an instance of early prosperity, such as was rarely met with in the history of such institutions; and the rapid progress which had been made in the first instance, was, no doubt, due in a great measure, to the fear of threatened legislative enactments. For the last year or two, however, this fear had greatly subsided, but he then held in his hand a copy of Sir James Graham's Medical Bill, with its most recent modifications, one of the clauses in which appeared to him to have a most important bearing upon the interests of the Pharmaceutical Chemists, and to prove that the grounds for the apprehension of danger were no less urgent now than at the period of the formation of the Society. The clause to which he alluded was as follows:—

"And be it enacted, that every person who, after the passing of this Act, shall act or practise as an Apothecary in any part of England or Wales, without having been registered by the said Council of Health, as a General Practitioner in Medicine, Surgery, and Midwifery, shall, for every such offence, forfeit and pay the sum of twenty pounds, to be applied to the use of the said College of General Practitioners in Medicine, Surgery, and Midwifery, and to be recovered by the said College by action of debt, in any of Her Majesty's Courts of Record at Westminster."

Now, it was evident that this clause was intended to renew the restrictive powers given by the Apothecaries' Act of 1815, with reference to medical practice, but without the exception which the latter contained in favour of Chemists and Druggists; and should this clause become law, they would all be exposed to the apprehension of a summary prosecution for a heavy penalty in every case in which they did any thing that could be construed into acting as an Apothecary. This new version of Sir James Graham's Bill had only just been published, and, indeed, he had only seen it since entering the Institution that morning; but it would claim the immediate attention of the Council, and it would be necessary to take active steps for protecting the body of Chemists and Druggists against this threatened innovation of their rights. It might, indeed, become necessary for the Council to appeal to their constituents throughout the country, for their influence and support in petitioning Parliament on the subject; and he trusted, should this be the case, that they would one and all unite in asserting their long-established privileges.

Mr. Cheetham, of Nottingham, moved "That the Report be received and adopted, and be printed in the Transactions of the Society."

Mr. Higgs, of Maidenhead, in seconding the motion, expressed the pleasure he had experienced in hearing so favourable a Report, and especially that part of it which referred to the provisions made by the Council for the education of the rising generation of Pharmaceutical Chemists. He thought this the most important feature in the operations of the Society, and he only wished that it was more within the reach of their Apprentices and Assistants in the country. He thought the subject alluded to by the Chairman was a very important one to them all, as it would be impossible for a Chemist and Druggist to carry on his business without incurring the penalty under such a clause as that which had been read.

Mr. Farmar was sorry he could not view some parts of the Report with the satisfaction expressed by the previous speaker. He thought the work of retrenchment had been begun at the wrong end, in omitting this year, for the first time, the appropriation of a part of the income of the Society to the Benevolent Fund. There were items of expenditure in the Financial Report, which might with much greater propriety have been reduced. When the Society was founded, the Benevolent Fund was stated to be one of its leading objects, and was said to be a bond of union, without which it was not likely to be permanent. He should move that £250 be placed to the Benevolent Fund.

Mr. Jacob Bell differed from Mr. Farmar in the opinion that the Council had begun the reduction at the wrong end. He thought the first thing to be done, and the most important consideration, was the establishment of the Society on a firm and permanent foundation, and the only foundation which could be relied upon was education. It was this which had already gained for the Society the influence and respect which it now enjoyed, and a perseverance in the educational measures, now in their infancy, would raise the Chemists in this country to the rank enjoyed by Chemists in other nations. At the time the Chemists were called together to oppose the bill of Mr. Hawes, it was the almost universal opinion, that they ought to obtain an Act of Parliament conferring on the body such privileges and protection as they ought to enjoy, and a very extensive correspondence ensued with members of the trade in all parts of the country, who strongly urged upon the Committee the necessity of an immediate application to Parliament. But it would have been useless to apply for a bill at that time. The Chemists had no more claim to such an Act of Parliament as they desired, than the grocers, the oilmen, the shoemakers, or any other class of

the community. They were not an educated body. Each individual, it is true, educated his apprentices in his own way, some in a proper manner, others imperfectly, but there was no test of proficiency—the public had no means of discriminating between the qualified Chemist and those who were entirely ignorant. It had always been a great disadvantage to the Chemists that any person was at liberty to establish the blue and red bottles, and call himself a Chemist, however destitute he might be of the rudiments of education. The Committee were aware that under these circumstances it was not likely that an application to Parliament, at that time, would be attended with success, and they had therefore thrown aside entirely all political measures, and turned their attention to that branch of the Society's objects from which their body was likely to derive the most substantial benefit. For upwards of four years the scientific and educational proceedings of the Society had been steadily persevered in, and the Institution had gradually assumed a position which entitled it to respect and consideration from the government and the public. Four years ago, if the Chemists had claimed the privilege of regulating the education and examination of their members, they would have been told "You are not an educated body, how can you educate others? You cannot be trusted with the examination of candidates, you have never been examined yourselves." Now the system of education was established, the examinations were in operation, the machinery of the Institution was so far advanced that it required nothing but the sanction of an Act of Parliament to complete its success, and enable it to ensure to the public the proficiency of all the future Chemists. Mr. Bell therefore contended, that the first and most important object of the Society was education, and the accommodation in the laboratory not being at present adequate to the demand, it was absolutely necessary immediately to expend several hundred pounds in enlarging the premises. When the Committee instituted the Benevolent Fund, and expressed a hope that it would soon come into effective operation, the subscriptions were double their present amount. But the members had cut down the supplies, and the funds would not admit of the grant to both purposes. It was therefore a choice of evils, and the Council thought the School of Pharmacy the primary object.

Mr. Bell observed, in reference to the Medical Bill, that it would be necessary immediately to take some decisive steps to avert the evil which would otherwise result from the clause which had been read, and it would afterwards be a matter for consideration whether the Chemists ought not to apply for a separate Bill. He thought this was essential. The Society had taken

the first step, it had obtained a Charter. But a Charter in itself was comparatively inefficient. It conferred no powers, excepting over the members of a voluntary society, who continued to uphold it only during their own will and pleasure. It gave no power to enforce the regulations respecting education and examination, and its chief or only benefit was as a step towards the attainment of an Act of Parliament, which had been the desideratum from the beginning. In conclusion, Mr. Bell adverted to the importance of unity among the Members, and zeal in the cause, as the most certain means of ensuring success.

Mr. Pedler concurred in the views which had been taken by the Council as expressed in the Report. It was certainly a subject of regret that the reduction in the subscription had rendered it necessary to suspend the grant to the Benevolent Fund this year, but he trusted the ultimate effect of the reduction would be to induce an accession to the number of Members in the Society, and thus to maintain the income at nearly its original amount. He had recently seen a statement, that a society of medical men in Edinburgh, having a sum of money which had been subscribed for the relief of distressed members, had proposed to pay it over to some benefit or insurance company, on certain stipulated conditions, as the best means of carrying out the original intention of the subscribers, and this, should it be found impossible, with our reduced subscription, to continue the annual grants to the Benevolent Fund, might be worthy the consideration of the Council.

Mr. Cubitt, of Norwich, considered the first and most important object of the Society to be education; he was much pleased to find that this object had been so efficiently carried out by the Council; yet he was in favour of maintaining the Benevolent Fund as a distinct feature of the Institution, and saw no reason why this might not be done under the reduced subscription. He was quite convinced that the number of subscribers to the Society might be greatly extended; in many parts of the country little was known, among the Chemists and Druggists, of the advantages which the Society offered, and of the great benefits which it had already conferred upon the body at large. He thought that too much had hitherto been left to the local Secretaries, and that it was desirable for the Council directly to bring under the notice of all the Pharmaceutical Chemists throughout the country, the importance of supporting an Institution so well calculated to promote their individual and collective interests.

The Chairman hoped the meeting would not suppose that the Council ever intended to discontinue permanently the grant to the Benevolent Fund. A new laboratory would not be required

every year, and it was only on this occasion that the grant was found impracticable.

Mr. M'Culloch enquired, whether the item of £15 for an accountant was not an unnecessary expenditure. He thought there were many members of the Council who were fully competent, with the Secretary, to manage the accounts, which, he fancied, could not be very complicated.

Mr. Lescher replied, as a member of the Finance Committee, that, in the first instance, the books were in rather a complicated state, and a difference of opinion existed as to the best manner of keeping them. It was therefore found advisable to call in the assistance of a regular accountant, who had recommended the substitution of new books on an improved principle. He trusted this expense would not in future be necessary.

Mr. Herring observed, in reply to Mr. Farmar's objection respecting the Benevolent Fund, that the necessity for omitting the grant this year was occasioned by the reduction of the subscription, which was so much desired, especially by country members. He suggested that the best means of increasing the Benevolent Fund would be to have a dinner. It was always found that a convivial meeting was the most effectual means of exciting benevolent feelings and supporting a fund of this description.

The Chairman enquired whether Mr. Farmar's motion was seconded, and

Mr. Baxter rose to second it; but, after a little discussion, it was withdrawn, and the original motion carried unanimously.

Mr. Whitton (of Horncastle) moved the second resolution: "That the thanks of this meeting be given to the Council and Officers of the Society, both in town and country, for their services during the past year."

Mr. Bartlett, in seconding the resolution, observed, that he had very great pleasure in expressing his sentiments on the subject. He had not a fault to find with the Report, and he thought the progress made by the Society in every respect was very satisfactory. The Council had acted as guardians of the body they represented, and much credit was due to them for the advancement they had made in the provisions for education. When he was an apprentice he had no means of obtaining scientific knowledge. There was no School of Pharmacy and no lectures to which he could resort. He thought the young men of the next generation would have cause to be grateful to the Council for their labours in introducing a proper system of education. He had much pleasure in seconding the resolution, which was then carried unanimously.

Mr. HERRING, on behalf of the Council, acknowledged the vote of thanks.

Mr. BURDEN regretted that no notice was taken in the Report of the Memorial which was presented to the Council, by a large number of Associates as well as Members, on the subject of late hours and Sunday trading. He thought many members threw obstacles in the way of improvement, by not allowing their young men the opportunity of attending the School of Pharmacy, and protracting the hours of business, so as entirely to deter them from prosecuting their studies at home.

Mr. HUMPAGE was strongly convinced of the duty which devolved upon employers, of facilitating to the utmost practicable extent, the attendance of their young men at the lectures provided by the Society. It was evidently of no use erecting a ladder, unless at the same time an opportunity was afforded, to those for whose accommodation it was intended, to ascend it. He had had practical evidence of the good resulting from the instruction given at that Institution, and every day would add to the number of those who would make this acknowledgment. He had only a short time ago received a letter from his late assistant, who is now in business on his own account in the country, and who warmly expressed his gratitude for the opportunity which had been afforded him of benefiting from the lectures given at the establishment of the Pharmaceutical Society. He and many of those around him, at the period of their pupilage, had been very differently circumstanced; and so fully was he aware of the defects of the old system, that he felt grateful for the provision which had been made for the succeeding generation. He fully concurred in the propriety of making education the primary object of the Society; and indeed, he thought this the most efficient method of promoting the objects contemplated in the establishment of the Benevolent Fund. They could not better provide against the liabilities to adversity, than by laying up a store of knowledge, and especially of that knowledge by the application of which they obtained their subsistence. Moreover, the cultivation of science tended to expand the mind and enlarge the range of its sympathies, and those men generally would be most disposed to assist their less fortunate brethren, whose sentiments were elevated by these means. In reference to the subject of Sunday trading, he thought the evil originated very much with the Apothecaries, many of whom kept their shops entirely open on Sundays, and thus compelled the Chemists to adopt the same practice in self-defence.

Mr. HERRING considered that the Council could not interfere with the regulations of individuals as to the time at which they

should open or shut their shops. The memorial which had been presented to the Council on this subject had received their deliberate consideration, but they could take no active steps with reference to it.

Mr. SQUIRE remarked, that when the deputation waited on the Council with the memorial, they were asked whether they could suggest any method of remedying the evils of which they complained; but they acknowledged that they could not. The fact is, that so long as the public require medicines at unseasonable hours, they must be supplied. The Chemist could not dictate to the Physician as to the hour at which he should prescribe, or to the patient as to the time at which he should send for medicines. There was, however, a great difference in different localities, and in houses of different descriptions of business in the same locality, as to the practicability of shortening the hours of business. It would be impossible to make any general regulations on the subject.

Mr. HALLOWS said he believed it was generally known that he entertained a very strong and decided feeling with regard to Sunday trading, but as a member of Council he felt that it was impossible for them as a body to do more than they had done in reference to it. He could assure the meeting that every attention had been given to the memorial, but the subject was considered to be one for individual rather than collective regulation.

The CHAIRMAN confirmed the statement of the previous speaker; the case under consideration was one in which the Council could not properly interfere, yet he was disposed to think that some good had been done by the movement which had taken place on the subject, and it would be found that there was an indirect allusion to it in the Report.

Mr. FARMER made a few remarks with reference to some items of expenditure in the financial report. He wished to enquire whether the Council contemplated publishing the Journal on their own responsibility, as he thought a saving of expense might be effected by this means.

The CHAIRMAN thought the proper period for putting these questions would have been while the Report was under consideration. In reference to the question of the publication of the *Pharmaceutical Journal*, he might state, that the Council were only responsible for that part comprehended in the Transactions of the Society; they had not contemplated undertaking the editing of the work; it must be evident that the Council could not do this without employing an Editor, and any man capable of performing such an office, and employed in that capacity by a public body, would expect to be handsomely paid.

Mr. Hooper, as one of the late Auditors, could state, that the items alluded to by Mr. Farmer had been narrowly scrutinized by the Board of Auditors, and he was quite satisfied that the price at which the Journals were supplied to the Society was such, that no profit could accrue to the Editor.

The Chairman said, the next business for the Meeting would be the election of the Council for the ensuing year.

The following continue Members of the Council by lot, agreeably with the provisions of the Charter:—

Bell, Jacob, 338, Oxford Street.
Gifford, Joseph, 104, Strand.
Horner, Edward, 20, Bucklersbury.
Knight, Henry, 25, College Green, Bristol.
Terry, Stephen, 25, Milsom Street, Bath.
Thompson, George, 12, Church Street, Liverpool.
Watts, John, 106, Edgeware Road.

The following is the List of Candidates proposed to be elected Members of the Council for the next year :—

Cubitt, George, Upper Market, Norwich.
Edwards, Charles, 63, Great Russell Street.
Glaister, Thomas, 12, North Street, Brighton.
Hallows, William Ayscough, 2, Clark's Place, Islington.
Hanbury, D. Bell, Plough Court.
Herring, T. 40, Aldersgate Street.
Ince, William, 31, Southampton Street, Strand.
Lescher, Joseph Sidney, 30, Bartholomew Close.
Morson, Thomas, N.R., 19, Southampton Row.
Pigeon, Richard Hotham, 31, Throgmorton Street.
Savory, John, 143, Bond Street.
Stamper, Ralph, 140, Leadenhall Street.
Squire, Peter, 277, Oxford Street.
Toswill, Charles Speare, 8, Torrington Place, Torrington Square.

And the following Members of the Society were nominated as Auditors—

Baiss, William Arnold, 125, Lower Thames Street.
Hooper, William, 21, Great Russell Street, Covent Garden.
Orridge, B. B., Broadway, Deptford.
Pedler, George S., 199, Fleet Street.
Wyman, John, Red Cross Street.

No other candidates being nominated, the Chairman declared the foregoing members to have been duly elected Members of Council and Auditors.

A vote of thanks was passed to the Vice-President for the kind and able manner in which he had presided ; which

The Chairman acknowledged, and he then dissolved the meeting.

ON THE DEPOSITION OF METALS BY ELECTRICITY, FOR PHARMACEUTICAL PURPOSES.

BY MR. J. P. TYLEE, BATH.

(Read on the 14th of May, before the Bath branch of the Pharmaceutical Society).

In directing your attention this evening to the application of electro-metallurgy, in depositing the nobler metals on vessels, scales, &c., in pharmaceutical and chemical use, I do not intend to enter into the philosophical principles involved, but would trace in as familiar a manner as possible the most useful processess, and the simplest methods of manipulation. My more immediate attention was drawn to the subject by the observations of Mr. Redwood, on the 8th of January, on a paper read by Mr. Mackinlay on the present subject—"That the process of electro-metallurgy would be of considerable practical value to the Dispensing Chemist, if it could be economically and efficiently applied. He alluded to the deposition of platinum in the ductile state on the pans of dispensing scales. It was well known that copper or brass scale-pans, usually used in dispensing, were very liable to become corroded from the action of many substances weighed in them; and this inconvenience would be obviated if they were covered with a thin coating of platinum by the electric process." Having for amusement worked electro-metallurgy from its earliest discovery, and precipitated vast quantities of copper, and also gold and silver to some extent, I beg leave to offer to the present meeting a few remarks on the process above alluded to. I hope to be enabled to show where it is useful, and where, on the contrary, worse than useless, in consequence of the loss of time and material. I will commence by describing the various batteries most generally in use, and offer such observations on each as I have found by experience to be correct.

The first that I will bring under your notice is that of Professor Daniell, and which bears his name. It is termed the Constant Battery: the continuous action is preserved by amalgamating the zinc, and supplying the solution of copper with crystals of the sulphate of copper. It is termed *constant* from its power of continuing a generally steady action for a lengthened period. Much misunderstanding has arisen from the use of the term constant. It is often thought to signify long continued action, whereas these properties are really different, for a battery may be constant but only remain in action for a short period; and again, a battery might continue in action for years and not be constant in its action. The property of long continuation, however, is by

far the most valuable. This form of battery is much used by many electro-metallurgists, but I conceive there is a great disadvantage in it; first, the length of time required to set it in action; secondly, the trouble and expense attending the use of porous tubes; and, lastly, the necessity of constantly reamalgamating the zinc.

The next battery to which I shall allude, is that of Mr. Alfred Smee, and certainly this is the most complete for all purposes of electro-metallurgy. It is the cleanest in use, and possesses many advantages over all others. A modification of this form of battery by Dr. Pring, late of this city, is a very useful apparatus. In this the platinized silver surrounds the zinc, thereby forming a greater surface of negative metal, and consequently a larger quantity of electricity; but it is not so well adapted for electro-metallurgy.

The last that I will bring under your notice is the terrestial battery. A certain number of zinc and copper plates are placed horizontally in the earth, and each layer covered with about two inches of mould, the zinc and copper being placed alternately. The terminal wires are brought together, and the battery remains in use for an indefinite period. This is certainly the most constant form of battery. I have one that has been in use for more than two years, and it is just the same as the first day it was buried; it is very useful for depositing gold and silver, but does not do for copper, unless a very large amount of metal is buried.

Having now disposed of the batteries, I will proceed to point out the cases in which the process may be applied with advantage. The pair of scales before you have now been gilded nearly two years. I anticipated Mr. Redwood, and should have used the platinum, but for the extreme difficulty in depositing the metal in the reguline state. The plan I adopted for reducing the gold is extremely simple: I take a solution of cyanide of potassium, to which I add as much oxide of gold as it will take up. The metal to be gilded having been well cleaned from all greasy matter, should be suspended from Smee's battery, in the solution on the zinc or positive pole, and a piece of gold nearly the same size attached to the silver or negative pole, and in a few minutes a deposit of gold will be perceived. The articles before you were gilded in this way. But, perhaps, the deposition or silver will be the most useful, and can be effected by the most simple means A saturated solution of cyanide of potassium is prepared, into which as much chloride of oxide of silver is introduced as it will take up, and a weak battery is used. I am sorry to differ from Mr. Mackinlay, but I have frequently tried his method of using a weak solution and a strong battery without success. The silver crucible on the table weighing 330 grains, was made according

to the above method, and in three days it was perfected. The method I adopted to form it was as follows:—I fused some fusible metal in a Berlin capsule, in the centre of which I introduced a piece of wire to suspend it; on this being immersed in the solution it was immediately coated with silver. It has been well tested. I have fused caustic potash in it, and used a great heat. According to Mr. Mackinlay's method, it would have required as many weeks. You will perceive there is no tarnish to this article. I was much surprised to see it stated in the same gentleman's paper, that the cause of the silver tarnishing was the *purity* of the metal. Brande states that pure silver does not readily tarnish, but when alloyed with copper is very susceptible.

I fear the precipitation of silver or copper for pharmaceutical purposes will not eventually succeed. The capsule before you has had a good coating of silver, but unless the metal is as thick as the crucible before alluded to, it would not be safe to use it. I have used acid in this, and find after a time, as Mr. Warington stated, that it fermented the silver, and acted upon the copper underneath. If platinum could be deposited in the ductile state, it would be of great utility, but from the very nature of the metal I fear that it will never be available in this way. All who have written on the subject state, that it is deposited with great difficulty. I believe I have tried every method, but without success.

EXTRACTED ARTICLES.

ON THE DISTILLED WATERS OF OUR PHARMACOPŒIAS.

BY ROBERT WARINGTON, ESQ.

The subject of flavoured waters, prepared by distillation or extemporaneously, through the medium of carbonate of magnesia, has for some time past engaged my attention; and as it is a question of considerable importance to the Pharmaceutical Chemist, I am induced to lay the detailed investigation before the Society.

The formulæ given for the preparation of distilled waters in the London Pharmacopœia of 1836, is as follows:—To a specified quantity of material, whether it be essential oil, flowers, herbs, bark or berries, let two gallons of water and seven ounces of proof spirit, having a specific gravity 0.920, be added, and submit the mixture to the process of distillation until one gallon shall have passed over. Presuming that the entire amount of spirit employed passes over in this operation, the resulting product will contain a quantity that will be equivalent to about 4½ ounces of rectified spirit of spec. grav. 0.838.

The Edinburgh form has rather less spirit to the proportion of materials, two gallons of water and three ounces of rectified spirit are so employed, and a gallon distilled.

The Dublin formula differs from the foregoing, in ordering half an ounce of rectified spirit to be added to each pound of the water after distillation, or in the ratio of five ounces to the gallon.

In the course of other investigations, some years since, I found that when a very small quantity of alcohol was added to distilled water, and the mixture kept exposed to the air for a length of time, the containing vessel being carefully covered with paper to exclude the dust, it became gradually con-

verted into acetic acid, and, by analogy, I was led to believe that the same effect would take place in these distilled waters; the following experiments were therefore put in operation to test the accuracy of these ideas.

In the distillation of essential oils, it is well known that the water which passes over is opalescent from its being highly charged with the oil, and that when thus impregnated, it will keep perfectly sound for a great length of time. Distilled waters were prepared from various of the essential oils without the addition of any spirit, and these were taken as the basis of the following experiments:—

Equal portions of the waters obtained from the oils of dill, caraway, pimento, spearmint and cinnamon were taken, and to one-half the proportion of spirit ordered by the London College was added, the other half remaining in its original state; these were all loosely corked, marked, and placed aside. After remaining six months they were examined, when the spearmint and caraway waters, with the spirit, were found to be distinctly acid, reddening litmus paper and causing an effervescence with carbonated alkalies; all the others remained perfectly sound. They were again examined after a lapse of twelve months; the acidity had increased in the previous cases, while the same waters without the spirit, remained perfectly unchanged, and evidenced no signs of acidity. On examination after another twelve months they did not appear to have undergone any further alteration.

I need scarcely mention, that in selecting the specimens specified, the object was to try the general action of ordinary exposure to the atmosphere on waters varying in their characters and sources, as other samples might have been chosen which would doubtless have become acid as soon, or even sooner than the caraway and spearmint, as for instance, rose-water, elder-flower, orange-flower, peppermint, and pennyroyal waters.

Another point in favour of these distilled waters keeping, was their having been prepared from their respective essential oils, and not from the herb, seed, or bark. It is stated that these waters are liable to become mucilaginous and sour when long kept, and that the small quantity of spirit is added to prevent this; from the foregoing experiments, however, it will be evidently seen to produce a directly contrary effect, and the formulæ of the Edinburgh and Dublin Pharmacopœias will be equally in error on this point.

It is curious that of the European Pharmacopœias, that I have looked into during this investigation, not one labours under this error, their instructions being simply to distil the materials with water.

On searching back through former editions of the London Pharmacopœia, to ascertain, if possible, whether the formulæ had always been the same, and if not, when this erroneous alteration had been effected, I found that in the Pharmacopœia of 1624 two classes of distilled waters are specified, entitled simple, and compound or spirituous; the former made without the addition of any spirit, either in the process or afterwards, the latter similar to the preparations entitled spirits of the present day; after this date the error of adding small portions of spirit seems to have originated, and to have been regularly copied, with very little deviation, from edition to edition, down to the year 1836, the general directions being to distil a certain quantity of the water from a given weight of material, and then to add five ounces of proof spirit to each gallon, *that it may be preserved*, or rather I may say in many cases, to spoil it. In the edition of 1836, the proportion of spirit was increased to the formula that has been already given, and this was also the form prescribed in some of the various dispensatories about the middle of of the eighteenth century.

On examining into the quantity of acid generated in the foregoing experiments, I found that half a pound of the caraway water required four grains of dry carbonate of soda to effect perfect neutralization, which is equivalent to 4.45 grains of real acetic acid. This acid was also isolated by distillation, and its identity proved by various tests.

We now pass on to the extemporaneous preparation of flavoured waters from their respective essential oils. The general formula given in the Pharmacopœia of 1836, in which it is introduced for the first time, is to triturate carefully together one drachm of the essential oil with one drachm of carbonate of magnesia, and afterwards with four pints of distilled water, and then strain. Now on examining the waters thus prepared, they are all found, without exception, to contain a notable quantity of magnesia, the proportions taken up seeming to vary with the various essential oils employed, all other circumstances remaining the same. Dr. Pereira, in his valuable *Elements of Materia Medica*, vol. i., p. 258, speaks thus of these waters :— "The magnesia (carbonate of magnesia) effects the minute division of the oil. Moreover, when the oils possess acid properties, as the old oils of pimento, cloves and cinnamon, it probably serves to saturate them. Prepared in this way the medicated waters usually contain a minute portion of magnesia in solution : hence, by exposure to the air, they attract carbonic acid, and let fall flocculi of carbonate of magnesia. Moreover, the magnesia unfits them for the preparation of solutions of some of the metallic salts, as bichloride of mercury and nitrate of silver."

The method of examination adopted in the following experiments was to take a measured volume of the water, say 1000 grains, and evaporate it to dryness at a temperature not exceeding 212°, then to ascertain carefully the weight of the residue, redissolve it in dilute acid, and test the resulting solution. Magnesia in the form of carbonate was invariably found, together frequently, with resinous matter from the oil ; this was more especially the case where oils of considerable age had been employed. By this mode of operating, the results obtained range from 0.50 grains, in the 1000 grain measures of the water, as in peppermint-water, to 1.20 grains in dill and pimento waters ; many others were tried, which ranged between these two points. It may perhaps be as well here to mention, that it was observed very soon after the application of the heat in evaporating, that flocculi of carbonate of magnesia invariably separated.

The general opinion has been that these waters were formed in consequence of the magnesia as a base favouring the union of the oil and water, and thus implying some combination of these materials ; but I was led to believe, from various circumstances presenting themselves during these experiments, that this was not in any respect the true cause, and that the carbonate of magnesia acted simply as a mechanical subdivider of the oil, if I may be allowed the expression, so that the water acted as a solvent with greatly increased effect upon an enormously extended surface of the essential oil, as is the case in distillation, where the cohesive attraction of the molecules being overcome by the influence of heat, the vapours of the oil and water rise together, are mutually diffused and pass over into the refrigerator or worm to be condensed, and thus solution is to a certain extent effected. Under this impression the same experiments were repeated, substituting for the carbonate of magnesia the kaolin or porcelain clay of Cornwall, or finely-divided silica in the form of powdered flints, and with perfect success, the resulting medicated waters being perfectly colourless, transparent, and having a full flavour of their respective oils. On evaporation no residue was obtained, except in a few instances a small quantity of resinous matter, where, as before mentioned, oils had been used which had been made a long time : this amounted in the case of pimento water to 0.50 grains.

Two questions remain now to be settled arising out of the foregoing experiments ; first, does the magnesia enter into combination with the acid oils existent in some of the essential oils used, as pimento, &c. ? or, secondly, is the oil simply taken into solution by the distilled water ? The fact of the carbonate of magnesia separating from the solution by the application of heat, and remaining always in the state of carbonate on evaporation to dryness at a temperature of 212° Fahr., is a strong argument in opposition to

the first of these questions, as I do not think the view taken by Dr. Pereira is possible, namely, that the magnesia of the carbonate of magnesia first combines with the acid of the oil, which, as a consequence, implies the evolution of its carbonic acid from its weaker affinity, and that then, by the absorption of carbonic acid from the atmosphere it is again deposited as carbonate of magnesia, thus making its affinity stronger; the second position being directly contradictory to the first.

On trying a repetition of the same experiments with the same materials, but omitting the essential oil, and going through precisely the same routine, I obtained from 0.50 to 0.70 grains of carbonate of magnesia by evaporation as the average results of many trials; so that I consider from these data we may fairly conclude no combination of the magnesia and oily acids had taken place, but that it was simply a solution of the earthy carbonate in the distilled water; nevertheless, in many of the experiments, the presence of the different oils evidently affected the solvent power of the water, and thus directly influenced the quantity of carbonate of magnesia taken up; and the resin existent in some of the old oils will account for the occasional increase of weight over this quantity, for it has been shown that this resin is soluble to some extent in water.

There can be no doubt, from the above experiments, that any insoluble substance in a fine state of division will answer the same purpose as the carbonate of magnesia much better, as, for instance, very fine porcelain clay, finely-divided silica, powdered glass, pumice-stone, &c. I am not aware how the use of carbonate of magnesia for the extemporaneous formation of these waters originated, except with the Pharmaceutist, as being a material generally at hand, and it is well known to have been the substance usually employed for this purpose for a great number of years, and was, I am informed, used by the perfumers to produce the same results long before its introduction for medicinal preparations.—*Proceedings of the Chemical Society.*

ON THE ANALYSIS OF SOILS.

BY ANDREW URE, M.D., F.R.S., &c. &c.

Having been recently engaged in a minute chemical examination of the soil of a large farm, remarkable for perennial fertility without manure,* I have been led to adopt some simplified methods of analysis, which may to a certain extent be practised by ordinary farmers, and may throw some light on the means of improving permanently the composition of their lands. The field from which the sample subject of analysis was taken, is situated on Marsh Farm, in Haveling Level, in the parish of Hornchurch, Essex, not far from the banks of the Thames, and nearly opposite to Erith. R. M. Kerrison, Esq., M.D., F.R.S., the proprietor, informs me that no manure has ever been applied to this farm of 200 acres during a period of at least fifty years, except once; and in that season the wheat became so heavy as to be in a great measure spoiled. It produces every variety of crop most abundantly.

The substratum, which lies beneath a three feet bed of the soil, is an alluvial deposit, replete with decaying vegetable matter; the remains probably of some ancient forest, which existed prior to the formation of the Daggenham Breach, through which the river had inundated a large district of country, and kept it submersed till about two centuries ago; when it was stopped out by the aid of a Parliamentary grant, administered under the direction of a skilful engineer. The soil over the whole farm is of very uniform texture and appearance; being a finely comminuted friable loam, quite free from stones, consisting of a fortunate mixture of fine siliceous sand, clay, oxide of iron, and carbonate of lime, with minute proportions of phosphate of lime and magnesia, but very little organic matter. It would seem, therefore, to derive its principles of fertility chiefly from the atmosphere, and the emanations from the subsoil.

* All the stable-yard dung is sold by the farmer.

The specific gravity of the soil, in its average state of dryness, is 2.2 to water called 1.0; indicating the presence of but little vegetable matter.

100 parts of it collected after a period of ordinary dry weather lose 11.2 by a steam heat of 212°, and readily re-absorb that portion of moisture when again exposed to damp air. When the dried residuum is calcined at a dull red heat, six parts of vegetable substance are burned away; at a higher temperature the carbonate of lime would become calcined, and cause an additional loss of weight, which might inconsiderately be mistaken for organic matter.

The first problem in an agricultural analysis, is to find the proportion of calcareous matter, as carbonate and phosphate of lime. This may be easily solved with the aid of the following instrument which may be called the *Lime-stone Meter*, one of which was presented and explained by me to the Council of the Royal Society of Agriculture, on the 29th of May last.

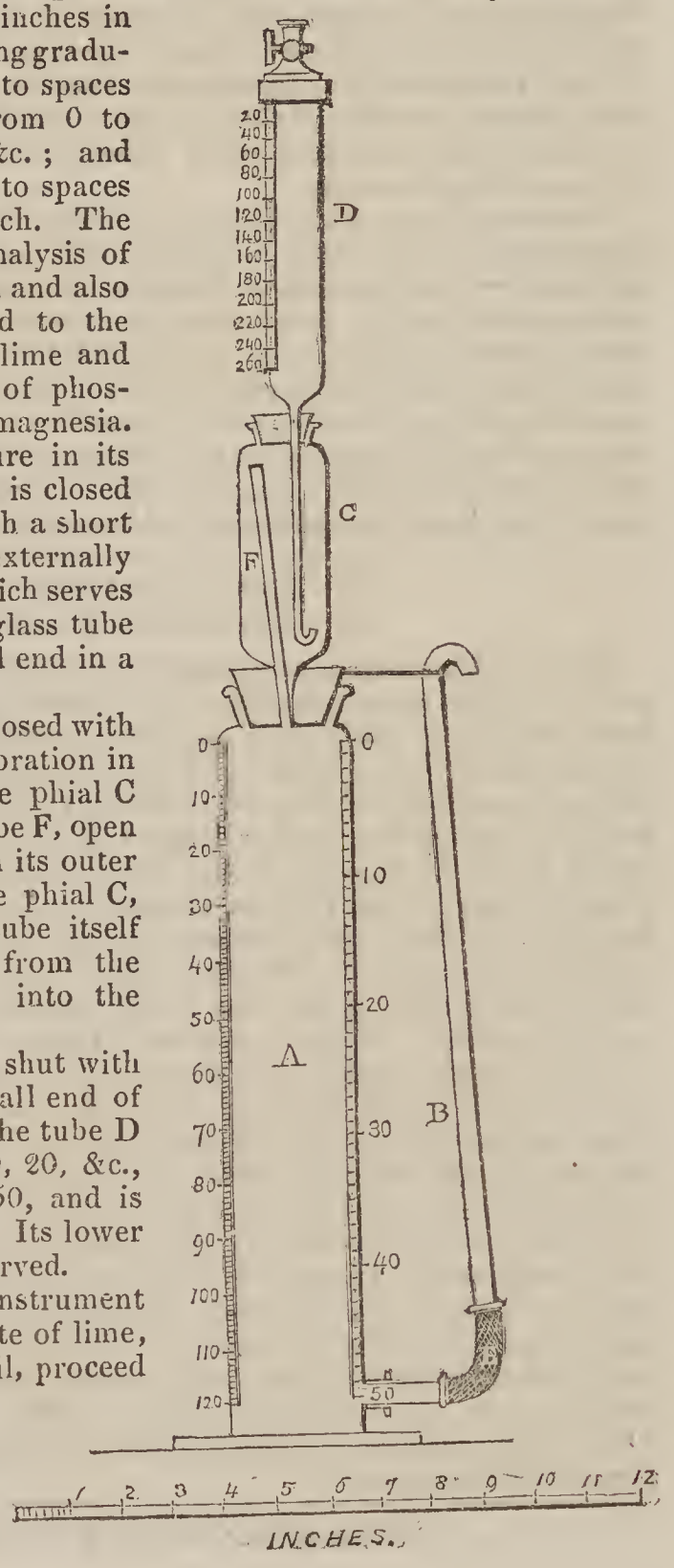
A, is a cylinder of glass, two inches in diameter, and fourteen inches long graduated on one side with a scale, into spaces of 100 water-grain measures from 0 to 12,000, marked 10, 20, 30, &c.; and graduated on the other side into spaces of 240 water-grain measures each. The former scale is used for the analysis of all sorts of alkaline carbonates, and also of acids; the latter is adapted to the direct analysis of carbonate of lime and marls; and indirectly to that of phosphate of lime and carbonate of magnesia.

The cylinder A, has a tubulure in its side near to the bottom; this is closed with a cork, in the axis of which a short glass tube is cemented, hooped externally to a collar of caoutchouc E, which serves as a joint to the upright long glass tube B, held near its upper recurved end in a hooked wire.

The top of the cylinder A is closed with an elastic cork, through a perforation in which the taper tail of the little phial C passes air-tight. The small tube F, open at both its ends, is cemented on its outer surface, into the bottom of the phial C, so as to close it, while the tube itself opens a free passage to gas, from the shoulder of the phial, down into the cylinder A.

The mouth of the phial C is shut with a cork, through which the small end of the tube D passes air-tight. The tube D is graduated into spaces of 10, 20, &c., water-grain measures up to 250, and is closed at top with a stop-cock. Its lower and capillary extremity is recurved.

In ascertaining with this instrument the proportion of real carbonate of lime, in any limestone, marl, or soil, proceed as follows :—



Lift out the phial C, and pour water into the cylinder A till it stands about half an inch below the line marked

0, and fill up this space with common linseed-oil. Restore the phial C to its place, pressing it in air-tight. Then take out its cork with its graduated tube, and introduce into the phial as many grains weight of the soil or marl as it is proper to operate upon. Of an average limestone 50 grains are sufficient, because the magnified scale of the *lime-proof* is adapted to the analysis of 50 grains of pure carbonate of lime. Of soils and marls, 100, 200, or even 500 grains, may be taken, because these substances will rarely contain one-tenth their weight of carbonate of lime. But as the result may always be obtained within five minutes, at the cost of half a farthing, several successive experiments may be made on different weights of the sample. Having introduced the proper weight of the object into the phial, cover it with water, till this stands a little above the point to which the recurved tube descends. Holding D in the hand, dip its bent point into a phial containing ordinary muriatic (hydrochloric) acid, diluted with its own bulk of water, and applying the mouth to the opened stop-cock, suck up the acid into the tube till this be about two-thirds full, then turn the key of the cock before it is taken from the lips, and the acid will not drop out when the tube is held upright. Replace the cork with its tube D in the phial C. Detach the long tube, B, from its wire-rest with the left-hand, and hold its curved extremity above an empty basin; then with the right-hand open the stop-cock of D, to let a little acid run down upon the marl, but shut it almost instantly again, lest too much acid should escape, and cause so brisk an effervescence as to occasion an overflow of the mixture into the small tube, F. The disengaged carbonic acid escapes through the tube F, presses on the surface of the oil in A, and causes a stream of water to flow from the tube B, into the subjacent basin. When the water ceases to run, open the stop-cock again, when more acid will descend, cause a fresh extrication of gas, and a further flow of water. The curved end of the tube B should be progressively lowered, as the oil falls in A, so as to maintain its level and that in the tube in the same horizontal plane. Whenever gas ceases to be extricated by the muriatic acid, the experiment is completed, and the number on the *lime-meter* scale opposite to the upper surface of the oil, denotes the number of grains of carbonate of lime, in the quantity of limestone, marl, or soil, put into the phial C for experiment. A little carbonic acid gas remains condensed in the muriatic solution, but this is not more than equivalent to the bulk of liquid acid introduced into the capacity of the apparatus; so that no compensation need be made on this account. For the purpose of minute chemical research, that portion of gas may be expelled by surrounding the phial C with a cloth wrung out of hot water, and the volume of dilute acid added, may also be taken into the account. Thus the composition of carbonates by an acid, and of acids by a bicarbonate, may be determined by means of this instrument with equal rapidity and precision.

The contents of the phial may be poured out into a porcelain capsule, gently heated, and thrown on a filter. The lime of the carbonate, as well as the phosphate of lime and the magnesia, will pass through in solution along with a very little iron. On super-saturating the acidulous liquor with water of pure ammonia, phosphate of lime (if present) will fall, and may be drained on a filter and dried. Taken off the dried filter, and digested with a little dilute sulphuric acid, sulphate of lime will result, characterized by its entire insolubility in dilute alcohol. Hence the sulphate washed with vinous spirits, dried and calcined, will represent by its weight one-fifth more than the original weight of the phosphate. By the action of the sulphuric acid, the iron precipitated by the ammonia with the phosphate is got rid of.

The magnesia, unless its proportion had been very great, will all remain dissolved as ammonia-muriate, and its quantity may be ascertained by precipitating it either with soda, or phosphate of soda. In the former case, the substance obtained when washed on a filter, dried and ignited, is pure mag-

nesia; in the latter, it is the ammonia-phosphate of magnesia, and when dried at the moderate heat of 120° Fahr., it represents by its weight about six times that of the magnesia present; or for 100 parts $16\frac{1}{8}$ of magnesia.

When a complete analysis of a soil is to be made, the following apparatus is convenient:—

A large glass flask, or matrass, with a sucked-in or concave thin bottom. This should hold at least a quart of water; and when the soil and dilute acid are introduced, it is to be placed on a stand over the gentle flame of a spirit lamp, while the beak of a large glass funnel, having its mouth covered with a porcelain basin, filled with cold water, is inserted into the neck of a flask. By this arrangement a continual ebullition may be maintained in the mixture of soil and acid, without loss of acid, or nuisance from its fumes, because the vapours are condensed whenever they reach the cold basin above the funnel, and a perpetual cohobation takes place. A boiling heat may be kept up in this way till every constituent of the soil, except the silica, becomes dissolved. Muriatic acid is generally preferred for the analysis of soils, and in somewhat greater quantity than the bases in the given weight of soil can neutralize. The funnel and porcelain basin should be properly supported upon the rings of the chemical stand. I generally subject 100 grains of soil to the action of boiling dilute acid in this way for six or eight hours; at the end of that period I throw the contents of the matrass upon a filter, and supersaturate the filtered liquid with ammonia. The silica which remains on the filter having been washed in the process, is dried, ignited, and weighed.

The alumina, iron-oxide, and phosphate of lime, thrown down by the ammonia, being washed in the filter, and dried to a cheesy consistence, are removed with a bone or tortoise-shell blade into a silver basin, and digested with heat in a solution of pure potash, whereby the alumina is dissolved, when its alkaline solution is to be passed through a filter, then saturated with muriatic acid, and next super-saturated with ammonia. Pure white alumina falls, which is to be separated on a filter, washed, dried, ignited, and weighed.

The iron and phosphate of lime on the alkaline filter may be dried, gently ignited, and weighed, or otherwise directly separated from each other without that step, by the action of dilute alcohol, acidulated with sulphuric acid, at a gentle heat. Thus the iron oxide will be dissolved, and its solution may be passed through a filter, while the sulphate of lime will remain upon it, to be dried, ignited, and weighed. Five parts of it correspond to four of phosphate. The iron is obtained by precipitation with water of ammonia, filtration, and ignition.

The first filtered liquor, with excess of ammonia, contains the lime of the carbonate, and the magnesia. The former is separated by a solution of oxalate of ammonia, with digestion in a gentle warmth for a few hours, filtration, and very gentle ignition of the washed dry powder, when the pure carbonate of lime is obtained. The magnesia, existing in the filtered liquor as an ammonia-muriate, may be obtained by precipitation with soda, or phosphate of soda, as already described.

For some refractory soils, in which the alumina exists as a double or triple silicate, it becomes necessary to fuse fifty grains of the sample, in fine powder, mixed with four times its weight of dry carbonate of soda, the mixture being put into a platinum crucible, and into a cavity in its centre, fifty grains of hydrate of potash being laid.

The crucible being slowly raised to a red-white heat, affords a fused liquid quite homogeneous, of a grey or brown colour, according to the metals present in it. Manganese gives a purple tint; and iron a reddish brown. The fused matter should be poured out into a shallow platinum basin; and, whenever it cools, it should be pulverized, dissolved in dilute muriatic acid, the solution evaporated to dryness, the dry mass again

digested in hot water, acidulated with muriatic acid, and the whole thrown upon a filter. Pure silica will remain on the filter, to be washed, dried, ignited, and weighed.

The filtered liquor contains the remaining constituents of the soil, and is to be treated as already described.

Besides these systematic investigations, researches may be made for certain peculiar substances, and especially the neutro-saline constituents. In this view 100 grains of the soil may be triturated with twenty times their weight of distilled water, placed in a beaker, till the clayey matter subsides, and the clear portion then be decanted into a filter. A little of the filtered liquor should be tested with nitrate of barytes, and also with oxalate of ammonia; and if each portion yields a precipitate, they show the presence of sulphate of lime; and the following steps ought to be taken to eliminate it entirely: 200 grains of the soil should be triturated with a quart of distilled water, holding fifty grains of sal-ammoniac in solution. The mixture should be allowed to clarify itself by subsidence, when the supernatant clear liquor should be filtered, and evaporated down to two ounce measures, and then mixed with that bulk of strong whisky (11 per cent. overproof). The whole sulphate of lime will be now separated from the fluid, and after being drained on a filter, may be dried, ignited, and weighed.

For determining the alkaline salts, the water filtered from the 100 grains of the soil should be evaporated down to one-fifth of its bulk, and then treated—1st, with nitrate of barytes for the sulphates; 2d, with nitrate of silver for the muriates; 3d, with oxalate of ammonia, for the nitrate or muriate of lime (provided no sulphate of lime is indicated by the first test); 4th, with litmus paper, for alkaline or acid reaction; 5th, with soda-chloride of platinum for potash salts, which are very valuable for the vigorous growth of many plants.

The portion of soil tested for potash salts should, before being digested in water, be gently calcined, to insure the expulsion of every particle of ammoniacal salt, otherwise the precipitate afforded by soda-chloride of platinum would be fallacious.

Another peculiar research of great importance is that which determines the amount of ammonia in a soil; and which may exist either ready formed, or in its elements, capable of affording a portion of the azotic food so indispensable to vigorous vegetation. The actual ammonia is easily obtained by distilling the soil along with some milk of lime. The distilled water will contain all the volatile alkali, which may be measured by the number of drops of a standard dilute acid, which it will saturate.

The *potential* ammonia, slumbering, so to speak, in its embryo elements, may be estimated by igniting 200 grains of the soil with its own weight of a mixture of hydrate of soda and quicklime, as described in my memoir on 'The Analysis of Guano,' page 277 of this Journal.

I have subjected the soil of Dr. Kerrison's farm to the various modes of research above enumerated, and have obtained the following results:—

1. By the application of my *limestone-meter* I obtained carbonic acid gas, equivalent to nine grains of carbonate of lime.

2. By igniting 200 grains of the soil along with 200 grains of mixed quicklime and hydrate of soda, in the appropriate apparatus, I obtained 0.34 grains of ammonia, or 0.17 per cent. of the weight of the soil. Hence 600 grains of the soil contain the azotic equivalent of one grain of ammonia. This remarkable fact reveals most plainly one secret source of the uninterrupted production of rich crops of cereals and other plants from it, without receiving any manure. How appropriate to such land is Virgil's beautiful title of the subject of his 'Georgics,' *justissima tellus!*

3. By the process of cohobation for eight hours, with dilute muriatic acid,

as also by the process of fusion with alkalis in a platinum crucible, and the subsequent treatment above detailed, I obtained—

1. Silica	56.0
2. Alumina	8.0
3. Oxide of iron	5.5
4. Carbonate of lime	9.0
5. Sub-phosphate of lime	0.4
6. Magnesia (carbonate)	0.5
7. Moisture separable by steam-heat	11.3
8. Organic matter, chiefly vegetable mould	6.6
9. Moisture separable at a red-heat	2.7
	100.0

Besides traces of muriate of soda, and muriate of lime (chlorides of sodium and calcium). The iron exists mostly in the state of protoxide, a circumstance owing, probably, to exhalations from the subsoil of sulphuretted, phosphuretted, and carburetted hydrogen. The fresh soil is of a grey colour, but becomes ochrey-red by calcination.

100 grains of the said soil, dried at 212°, absorb eight grains of moisture in twenty-four hours; while 100 grains of the comparatively steril soil of Regent's Park, dried equally, absorb only five grains: a difference due chiefly to the finer comminution of the former.

Since the phosphates are such precious ingredients towards fertilizing soils, it is desirable to possess a clear and simple test of their presence. For this purpose digest the soil, for an hour or so, with a moderate heat, in dilute nitric acid, free from muriatic (*viz.* which affords, when largely diluted, no precipitate, by the addition of a solution of nitrate of silver). Throw the mixture on a filter, and to the filtered liquid add potash-water, cautiously, till the instant that a precipitate begins to appear; then drop into it a weak solution of nitrate of silver. If any phosphoric salts be present, a yellowish precipitate will immediately fall, which is re-soluble in an excess of nitric acid. Whatever is not thus dissolved is chloride of silver, and ought to be separated by filtration: on adding then weak water of potash (not ammonia) cautiously to the filtered liquid, the pure phosphate of silver will be obtained, without any alumina or iron, provided the liquid be still acidulous in a slight degree. It ought to be remembered that chloride of silver falls in a *white* curdy form, quite different from that of the phosphate of silver. The portion of soil used for this experiment should be fresh, and not calcined, because the *phosphates*, when ignited, afford white precipitates with salts of silver. The stronger the solution of the phosphoric saline compound is, the more characteristic is the yellow precipitate with silver; and then ammonia may be used for effecting the partial saturation of the acid excess. Sulphate of magnesia is an excellent re-agent for detecting phosphoric acid, and for separating it from the above acid solution, when it is partially neutralized with ammonia; for the magnesia forms, with the phosphoric acid and ammonia, the insoluble granular precipitate of ammonia-magnesian phosphate. A solution of sulphate of magnesia, containing a little sal-ammoniac, is probably the best test-liquor for detecting phosphates in faintly acidulous, but still better in neutral, solutions.

In almost all soils of an arable nature under cultivation in this country, there is a sufficiency of calcareous matter present to counteract the combination of phosphoric acid with alumina or oxide of iron, for which reason it would be an idle refinement of agricultural analysis to search for phosphates of alumina and iron. As for manganese, often associated with iron, it exists in too small a proportion, and is possessed of too little value to make

it worth while to effect its separation. It gives to calcined iron-oxide a black hue, and is characterized in its saline solutions by the flesh-coloured precipitate which it affords with hydro-sulphuret of ammonia, after the whole of the iron has been thrown down by boiling the solution of the two metals with pure carbonate of lime.

The organic matter in any soil may be correctly estimated by calcining its powder pretty strongly till the carbonic acid be expelled from the lime in it. The loss of weight, deducting that due to the carbonic acid gas (which is known from an independent experiment), gives the quantity of organic matter. Its quality is determined by the ultimate analysis by means of hydrate of soda and quicklime, as previously stated.

ANALYSIS OF THE SEVERAL VARIETIES OF MANNA OF COMMERCE.

BY A. LEUCHTWEISS.

Manna, which has from the most remote ages been in use as a remedy, is, as is well known, the concrete juice exuding from the wounded bark of the *Fraxinus Ornus. Lin.* As a comparative analysis of the different sorts of manna was wanting, I have examined the three varieties most commonly met with in the market : I. *Manna canellata* ; II. *Manna canellata in pieces* ; III. *Manna calabrina*, and found them to contain the following substances, which I proceed to examine separately:

1. *Mannite.*—To obtain pure mannite, the sugar in the manna must be first destroyed by fermentation. If we now evaporate the filtered solution to crystallization, and then add sufficient boiling spirit of 82 per cent. to dissolve it completely, the greater portion of the mannite will crystallize on cooling, and may be obtained as a pure white substance by washing with cold spirit. The quantity of mannite obtained from the three kinds of manna varied as follows : I. 42.6 ; II. 37.6 ; III. 32.3 per cent. The mother liquor evaporated in a water-bath yielded I. 40.8 ; II. 40.8 ; III. 42.1 per cent. of residue, which, when dried at 212° Fahr., was of a dark brown colour. It contained yet mannite, which was with difficulty removed by spirit. To obtain mannite from manna, it would probably be more advantageous to treat an aqueous solution of manna, the sugar of which has been destroyed by fermentation, with animal charcoal, and to evaporate the clear solution to crystallization.

2. *Sugar.*—To determine the quantity of fermentable sugar, an aqueous solution of manna was brought into a state of fermentation by means of yeast, and the carbonic acid generated was dried by chloride of calcium, and collected in a potash apparatus, to which a tube filled with fused potash was added. A glass tube, whose extremity was drawn out to a fine point and hermetically closed, extended into the fermenting fluid. On completion of the experiment, it was opened to enable me to draw air through the apparatus, and to displace the carbonic acid effectually. The temperature of the fermenting fluid was steadily maintained at 64° 4 and 77° Fahr. The three kinds of manna yielded respectively I. 4.01 ; II. 4.62 ; III. 6.74 per cent. of carbonic acid, while 100 parts of sugar of grape gave 44.84 parts of carbonic acid, consequently the quantity of carbonic acid found would correspond with from 8.94 to 15.03 of crystallized grape sugar.

3. *Mucilage.*—As the gumlike substance which remains after boiling the evaporated mother liquor of manna with pure alcohol cannot in this manner be obtained free from mannite, I endeavoured to analyse it in its combination with oxide of lead. A clear solution of mannite was precipitated with a solution of sugar of lead. The light grey precipitate was first dried over sulphuric acid, then at a temperature of 266° Fahr., when the organic

substance in combination with lead was found to have the following composition :—

		Calculated.	Found.
C_6	450.7	45.04	45.31
H_4	49.9	4 98	5.09
O_5	500.0	49.98	49.60
	1000.6	100.00	100.00

These numbers correspond with those which Mulder found to be the composition of mucilage in combination with lead.

4. *Resin.*—If an equal volume of water be added to manna, and the solution shaken repeatedly with ether, it becomes yellow, and leaves on distillation, besides an acid fluid, a yellow resin, which may be freed from acid by washing it with hot water. It was now dissolved in hot pure spirit, and filtered while hot; on cooling it deposited a small quantity of a white powder. The solution is of a reddish brown colour, but perfectly clear; its odour was very unpleasant, its taste nauseous, irritating, and disagreeable. Water rendered the solution turbid and milky. Ammoniacal nitrate of silver produced after some time a dark discoloration, and a precipitate. An alcoholic solution of sugar of lead produced a brown precipitate, which was increased by the addition of ammonia. The quantity of resin obtained from six pounds of manna was very small. The composition of the resin appeared to be

	I.	II.
Carbon	66.99	60.77
Hydrogen	8.36	7.50
Oxygen	24.65	31.73

But these results differ considerably from each other, and, therefore, show that the examined resin was not pure, and the analyses consequently are not to be relied on.

5. *Acid.*—Manna contains but a small quantity of acid, which is extracted at the same time with the resin by means of ether.

On evaporating an aqueous solution, a yellowish brown resinous substance separates. If the aqueous solution of the acid be again diluted with water, filtered and evaporated, a quantity of a brown substance is again obtained, so that the acid appears to be converted into the resin, but in this manner the acid could not be obtained in a state of purity.

The aqueous solution of the acid is not changed by sulphuric or muriatic acids, but nitric acid renders it, on application of heat, yellow. Carbonic acid and the caustic alkalies render it yellow, but the colour disappears on addition of a mineral acid. Ammoniacal oxide of silver instantly precipitates metallic silver; sugar of lead produces a lemon coloured precipitate, which is soluble in ammonia. The acid does not precipitate the salts of tin, consequently no lactic acid is present. On distilling the acid a slightly acid fluid of unpleasant odour passes over, which does not reduce the salts of silver.

6. *Ashes.*—On heating the varieties of manna they melt and swell extensively with a dark discoloration, and an inflammable gas escapes. The ash is not readily burnt to a white colour, and effervesces with acids. Its chief constituents are: potash, lime, magnesia, oxide of iron, phosphoric acid, muriatic and sulphuric acids in very slight quantity, clay and silica, which latter are probably impurities admitted in the collection of the manna. The three varieties yielded respectively I. 1.32; II. 1.99; and III. 1.97 per cent. of ashes.

7. *Water.*—On drying the varieties of manna at 212° Fahr. they assume a brown colour and yield a brownish red powder, which attracts water from the air, varying from 11.1 to 13.2 per cent.

8. *Insoluble constituents.*—Manna contains impurities, consisting of sand,

earth, bark, &c., which remain insoluble, and were collected on the filter and dried at 212° Fahr. The residue amounted to I. 0.40 ; II. 0.98 ; III. 3.24 per cent.

The following *resumé* will show the results obtained in the analyses :—

	I. Manna canellata.	II. Manna canellata. In pieces.	III. Manna calabrina.
Water	11.6	13.0	11.1
Insoluble substance	0.4	0.9	3.2
Sugar	9.1	10.3	15.0
Mannite	42.6	37.6	32.0
Substances similar to vegetable mucus with mannite, resinous and acid substance, with a small quantity of nitrogenous matter	40.0	40.8	42.1
Ashes	1.3	1.9	1.9
Total	105.0	104.5	105.3

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DECOMPOSITION OF TINCTURE OF IODINE.

BY HERZOG.

Tincture of iodine is very apt to decompose if kept for a long time, or if the bottle is not well stopped, in consequence of the action of the iodine on the spirit forming iodurettted hydrogen, iodine ether, and probably some other products. Tincture of iodine may be easily tested by shaking it with an excess of copper filings until it is totally discoloured. The copper, when filtered, tells the quantity of iodine by its increase in weight; the filtered solution contains a free acid, but no copper; and the decomposition which has taken place may be detected by the ethereal odour and acid reaction of the fluid. Calomel produces a yellowish white precipitate, which afterwards becomes red. Ammoniacal nitrate of silver a yellow flocculent precipitate, which becomes grey under water, at 212° Fahr. During evaporation, the filtered solution gives out a red irritating vapour: if we saturate with potash, evaporate and heat the residue, a peculiarly smelling vapour escapes, a little ash separates, and the residue effervesces with acids.—*Pharmaceutisches Central Blatt*, No. 57.

EXPERIMENTS WITH THE EXTRACT OF HYOSCYAMUS.

BY SCHEIDEMANDEL.

The author's method of preparing narcotic extracts had been objected to, 1. Because in the fine powder which he passes through the sieve, the quantity of active constituents is probably greater than in the coarser powder where the woody fibre predominates. 2. Because by displacing the spirit from the powder, when exhausted, with water, the quantity of extract is increased at the expense of its activity. These objections induced the author to undertake a few experiments with fine and coarse powder of hyoscyamus. 1000 grains were digested and placed in a glass cylinder furnished with cotton in six ounces of ether. The fluid which at first passed through, was of a dark yellowish green colour, and subsequently of a lighter shade. To displace the ether, four ounces of alcohol at 30 per cent. were gradually added, when the fluid passing through the filter was no longer yellowish green, but bright green.

The ethereal extract was now placed in a porcelain saucer to evaporate the ether. On the following morning, the contents of the saucer were of the consistence of oil. Placed on a moderately warm stove for a quarter of an hour the mass became more fluid; but on cooling, it had so far condensed, that the saucer could be turned over without fear of spilling the contents. The weight amounted, in the case of the fine powder, to thirty-six grains, in that of the coarse to eighteen grains.

To the contents of the cylinder under treatment with spirit, five ounces of spirit were further added, and when the drops passing through the filter were tolerably bright green, small quantities of distilled water were poured on, until the grass green drops began to be turbid; the cylinder was now removed. The alcoholic extract was filtered and evaporated at a very gentle heat over a sand-bath to the consistence of an extract. In this manner 144 grains of extract were gained from the fine powder, and 120 grains from the coarse. The residue of the herb remaining under treatment with water in the cylinder was placed on a linen filter and smartly pressed. The four ounces of fluid thus obtained were of a dark brown colour, and deposited, on standing for several hours, green flakes of chlorophyl, on which account it was refiltered, when a clear dark brown fluid passed over. The residue of the herb was dried over a stove at a gentle heat, and weighed 810 grains in the case of the fine powder, and 848 grains in that of the coarse.

The brown fluid which had passed through the filter was exposed, in a porcelain saucer, to a gentle heat in a sand-bath; when on its evaporation, many gelatinous small lumps separated, giving the aqueous extract an unequal appearance. The evaporation was now arrested, and the saucer placed aside to cool, the separation was thus increased.

The dried residue was now moistened with distilled water, and treated in the cylinder with distilled water, until the fluid passing through was colourless. This process was very slow in progress, requiring nearly six days for its completion. The fluid collected was filtered, added to the aqueous extract in the saucer, and evaporated at a gentle heat. 270 grains of a brown extract were thus obtained from the fine powder, and 300 grains from the coarse. The properties of the three extracts were in both cases the same.

Ethereal Extract.—*Colour*, dark green. *Odour* and *taste* narcotic, nauseous, and intoxicating, reminding me strongly of hyoscyamus. *Water* dissolved only a sufficient quantity of the ethereal extract to render it scarcely yellow. *Pure alcohol* dissolved it perfectly. *Alcohol of 32 per cent.* dissolved about one-half of it, assuming a beautiful green colour. Heated in a *platina spoon* over a spirit lamp it first melted quietly like wax, then emitted an odour of boiling linseed oil; on continuing the heat it became dark brown, and burnt with a bright red flame depositing carbon. The black residue, which had the lustre of a resin, was still further heated. It swelled and inflamed, and on putting out the flame emitted an unpleasant stinking odour of burnt oil. The platina spoon was now heated to a white heat, when the whole of the residue was consumed.

Alcoholic Extract.—*Colour*, dark green with a brownish tinge. *Taste* and *odour* strongly like hyoscyamus, with a bitter nauseous taste. In the air it attracted moisture. *Water* dissolved the spirituous extract perfectly, forming a dark greenish brown solution. Heated in a platina spoon it melted first quietly, then emitted blue empyreumatic vapours, and burnt with a bright flame, continuing to burn after removal of the spirit lamp, and leaving a black voluminous ash. On increasing the heat the ash was diminished in quantity, but a slight residue remained, which, when treated with distilled water, reddened turmeric paper.

Aqueous Extract.—*Colour*, dark brown. *Odour* by no means narcotic. *Taste* nauseous, saline, and irritating. A small quantity of the extract rubbed down with caustic potash emitted an odour of ammonia, which was

also proved to be present by a glass rod dipped in hydrochloric acid. Treated in a *platina spoon* over a spirit lamp the extract swelled up considerably, became dark brown, and emitted an unpleasant urine-like odour ; on continuing the application of heat the ash assumed a cylindrical form, subsequently sank, and left a black porous coal, which was treated with distilled water and filtered. The fluid which passed through the filter was clear like water, changed the colour of turmeric paper strongly, and contained carbonate, sulphate, and muriate of potash.

From these experiments it appears that more alcoholic extract may be obtained from the fine powder of hyoscyamus than from an equal quantity by weight of the coarse powder. But from four ounces of powder of hyoscyamus, only from two to three drachms of fine powder can at the most be sifted off. The experiments further prove that *ether* extracts the oily and waxy constituents with some of the narcotic colouring matter. *Spirit*, the narcotic constituents and extractive as well as the narcotic colouring matter ; and lastly, *Water*, the gum, starch, mucilaginous sugar, and albuminous extractive, with various salts. The latter substances certainly do not add to the activity of the hyoscyamus.—*Pharmaceutisches Central Blatt.* No. 57.

ON NIOBIUM, A NEW METAL DISCOVERED IN THE BAVARIAN TANTALITE.

BY H. ROSE.

A COMPARATIVE examination of the tantalite of Finland and that of Bavaria has led to the discovery that the latter contains two acids—*tantalic acid*, as described by Berzelius, and a second acid differing somewhat from the former. The latter is the oxide of a new metal, differing from all other metals yet known. Rose has given it the name of Niobium, and calls the oxide *Niobic acid* (after *Niobe*, the daughter of Tantalus) to show the analogy of the metal and its oxide to tantalium and tantalic acid.—*Pharmaceutisches Central Blatt*, No. 58.

REVIEWS.

ENTWURF EINER ARZNEI-TAXE. Von TH. W. C. MARTIUS, Apotheker in Erlangen. *Zweite umgearbeitete Auflage*, 1842.*

THIS sketch was first published by Martius in the *Pharmaceutical Correspondence-Sheet for the South of Germany.* The present edition contains the Assize of 3060 articles.

The book is divided into four parts. The first part consists of 97 pages, and contains the charges for both crude and prepared medicines. The second part consists of about five pages, and includes the charges to be made for various Pharmaceutical operations undertaken in the preparation of prescriptions. The third part, consisting of about two pages, contains the prices to be charged for the vessels employed to hold the medicines ; and the fourth part, of about four pages, consists of remarks on

* *Sketch of an Assize for Medicines.* By T. W. C. Martius, Apothecary at Erlangen. Second edition improved. Erlangen, 1842. 8vo, 108 pp. We are favoured with a copy of this work by Professor Theodor Martius. —ED.

the *Sketch*, and contains observations on weights and on prescriptions, to guard against misunderstandings in their preparation, and a few remarks on Apothecaries' bills.

I. *Assize of crude and prepared Medicines.*—We subjoin a few examples illustrative of the plan, as well as of the prices charged, premising that the ounce is equal to 482 grains troy; while a florin is worth about 1*s.* 8*d.*, and a kreutzer is a sixtieth part of a florin, and therefore is equal to about one-third of a penny of English money.

	Weight.	Fl.	Kr.
Acetum Aromaticum	1 ounce	—	4
Acidum arsenicosum pulveratum	1 "	—	10
——— tartaricum pulveratum	1 "	—	20
Aqua Menthæ piperitæ	6 ounces	—	9
Balsamum Copaivæ	1 ounce	—	18
Camphora	1 "	—	20
Extractum Belladonnæ	½ "	—	20
Magnesia sulphurica depurata	1 "	—	4
Oleum Memthæ piperitæ destillatum Anglicum	3 drops	—	2
Radix Rhei Muscovitici pulverata	½ ounce	—	30
Tinctura Aloes	1 "	—	10
Veratrinum	1 scruple	2	—

II.—*Assize for Pharmaceutical Operations.*—We select the following as illustrations:

	Kreutzers.
Solution of Salts, including the necessary filtration.	
a. If cold,	
Not exceeding six ounces of liquid	2
Not exceeding twelve " "	3
b. If hot (Solutions of Salts, of Manna, and Tamarind Pulp),	
Not exceeding six ounces of liquid	3
Not exceeding twelve " "	4
c. Solutions of Arsenic, Corrosive Sublimate, &c.	
Not exceeding six ounces of liquid	4
For every three ounces in addition	1
Filtration.	
Not exceeding twelve ounces	2
For every additional pound	1
Preparation of Pill Masses.	
a. Containing no powerfully smelling medicines, whether large or small masses	4
b. Containing Corrosive Sublimate, Asafœtida, Musk, Balsam of Copaiva, Camphor, Oil of Asphaltum, &c. &c.	6
Pill-making, whether of twelve or three grains, including the Lycopodium, or Liquorice Powder,	
Not exceeding 30 Pills	4
" " 60 Pills	5
" " 90 Pills	7
" " 120 Pills	8
Gilding Pills, for every drachm	5
Silvering Pills " "	3

Preparation of Powders by division.

a. If one grain of the principal ingredient cost at the least one kreutzer, this as well as the other ingredients, is to be charged. Every powder which does not exceed one drachm in weight to be charged at one kreutzer per dose; but the wrapper must not be charged separately. The mixture of the powders, the envelopes, and the labels, not to be charged.

b. If from one to four grains of the principal ingredient cost one kreutzer, the charge, inclusive of the other substances, will be :

	Kreutzers.
For a single Powder	4
Not exceeding four Powders	8
" " six Powders	10
" " twelve Powders	18
" " twenty-four	30

The mixture of the Powders, the envelopes, and the labels not to be separately charged.

III. *Assize for Vessels, including Bottles, Boxes, Gallipots, &c.*

	Kreutzers.
Phials of green glass, with cork, cap, and label :—	
Not exceeding three drachms	2
" two ounces	3
" six ounces	4
" twelve ounces	6
Phials of white glass, with cork, cap, and label :—	
Not exceeding three drachms	3
" two ounces	4
" six ounces	5
" twelve ounces	
Boxes—*a.* Wooden, lined :—	
Not exceeding one ounce	2
" two ounces	3
" four ounces	4
b. Pasteboard :	
Not exceeding one ounce	2
" two ounces	3
" four ounces	4
Pots—*a.* Glazed, earthenware :	
Not exceeding one ounce	2
" two ounces	3
" three ounces	4
b. China :	
Not exceeding one ounce	3
" two ounces	4

The capping and string is not to be charged separately, but for the label a charge of one kreutzer may be made.

Paper-bags :	
Not exceeding six ounces	1
" twelve ounces	2

A separate charge may be made, for the label, of one kreutzer.

Rolling plaster, in paper with label :	
For every ounce	2

Paper envelopes, in shape of boxes :			*Kreutzers.*
Containing from	2 to 4	powders	2
"	5—10	"	3
"	11—18	"	4
"	19—24	"	5

IV.—*Supplemental Observations to the Sketch of an Assize for Medicines.*

To prevent mistakes, the following observations should be well borne in mind:—

a. AS REGARDS THE WEIGHTS.

The weight to be used in all shops is that introduced into Bavaria in 1811, as the Apothecaries' weight. All medicines are to be weighed, with the exception of distilled waters, which may be measured. Vinous and spirituous liquids are not to be measured. Of liquids ordered in drops, thirty drops are to be considered equal to one seruple. By Mp (Manipulus) half an ounce is understood ; by Pg (Pugillus) two drachms, whether the quantity refers to petals or leaves.

b. AS REGARDS PRESCRIPTIONS.

Castoreum muscoviticum and its tincture are always to be dispensed when the physician does not expressly require English castor.

Cinnamonum Ceylonense should always be dispensed if *Cortex cassiæ cinnamomeæ* is not expressly prescribed.

For *Cremor tartari solubilis*, *Tartaras boraxatus* should be given.

Decoctum saturatum. If the quantities of the principal ingredient be not given, one drachm should be used for every filtered ounce.

The same observation applies to *Infusum saturatum.*

When the physician has not mentioned the quantities for making infusions or decoctions, saturated preparations are to be understood.

Folia sennæ, Alexandrian leaves are always to be dispensed.

Magnesia carbonica, the light variety is understood.

Oleum menthæ piperitæ, the German preparation is to be understood in every ease.

Pulpa Tamarindorum, *Roob Juniperi*, and the like inspissated juices of fruits which are not totally soluble in water, should be earefully rubbed down with the prescribed fluids, and only filtered when the physician expressly orders filtration. In every case where insoluble or heavy substances which sink to the bottom of the bottle, are ordered in a mixture, the apothecary should add to the label, even if it be not ordered in the prescription, *to be shaken !*

Sinapisms are to be made by simply stirring the powder of mustard with water.

Spiritus Vini rectificatissimus, 36° Beck, is to be dispensed when spiritus vini galliei, &c. is not expressly ordered.

Syrupus communis, means Syrupus Hollandicus.

Syrupus papaveris should be understood to mean *Syrupus Papaveris Rhœados.*

Syrupus papaveris albi is to be dispensed where *Syrupus diacodion* is prescribed.

For *Tartarus solubilis*, dispense potassæ tartras.

Tinctura colchici means a tincture of the seeds, if it be not expressly added *ex bulbis.*

Tinctura rhei. The aqueous tincture is to be used where *vinosa* is not expressed.

Zincum oxydatum album. The preparation by heat is to be dispensed where *via humida paratum* is not prescribed.

Beside this, the apothecary should always accurately dispense the

medicines prescribed *e. g. Elixir aurantiorum compositum*, and *Elixir balsamicum temperatum Hoffmanni.*

If extraordinarily large doses of heroic medicines be prescribed, these prescriptions are only to be made up when the quantities of such medicines are denoted by letters.

In making up pill masses where the quantity of any ingredient is left to the option of the apothecary, he must always name the quantity he has used on the prescription. *Lycopodium* is always to be used as powder for pills where another powder is not expressly named.

Aqueous extracts are always to be dispensed when spirituous extracts are not expressly ordered.

Acids of which various grades of concentration are in use, should always be dispensed in the dilute form, unless concentrated acid be prescribed.

All *substances* which are in use both in the *crude* and *purified* state, should be dispensed in the latter state, unless crude be ordered.

Tinctures, &c., which are kept of various degrees of strength, are always to be dispensed in the weak form, unless otherwise prescribed.

For every prescription dispensed after eleven o'clock at night, the apothecary may charge 18 kr., in addition to the amount according to the assize; but the sum cannot be augmented if more than one prescription is made up.

C. AS REGARDS THE APOTHECARIES' BILL.

All bills delivered to public institutions, or whose payment falls to the state need not be stamped. If they amount to fifty florins and are paid within the year, the Apothecary must deduct 10 per cent.; if not paid within that period, the Apothecary may charge 4 per cent. for the credit. The same rule applies to bills for private persons. For the poor, the apothecary may make a reduction in his prices, but he must make a note of this reduction on the prescription.

PRACTICAL FACTS IN CHEMISTRY, *exemplifying the Rudiments, and showing with what facility the Principles of the Science may be experimentally demonstrated at a trifling expense, by means of Simple Apparatus and Portable Laboratories, more particularly with reference to those by* ROBERT BEST EDE. *A new and enlarged edition, to which is added a distinct chapter on Agricultural Analysis.* 12mo, pp. 206. London: Simpkin, Marshall, and Co., and T. Tegg.

WHATEVER tends to promote a taste for scientific pursuits, cannot fail to be useful to the public; and if this little book should at the same time prove useful to the author by encouraging the sale of his portable laboratories, he fully deserves any benefit he may derive from it. With or without the laboratory the book is calculated to assist apprentices in their juvenile experiments.

THE DUBLIN HOSPITAL GAZETTE. *Published on the* 1st *and* 15*th of each month.* Dublin: Samuel J. Machin, 28, Westmoreland Court;—London: Joseph Thomas, 1, Finch Lane, Cornhill.

THE form of this journal is similar to that of the *Lancet*, and it contains reports of cases, clinical remarks, experiments on new

remedies, toxicological articles, reviews, and other information valuable to the profession. The hospitals in Dublin furnish a wide field for research.

THE BRITISH AND AMERICAN JOURNAL OF MEDICAL AND PHYSICAL SCIENCE. Edited by ARCHIBALD HALL, M.D., Edinburgh. Vol. 1, No. 1, April, 1845. *To be continued Monthly.* Montreal: John C. Becket, St. Paul's Street.

THIS journal, which in form resembles the above, is not limited to medicine, but embraces the collateral Physical Sciences, Natural History, Mineralogy, Geology, Meteorology, and the statistics of the British-American provinces. We quote the following extract on "The Medical Bill:"

"The fourth session of the legislature of United Canada has drawn to a close, and the Medical Bill, or more properly speaking, "The Bill for regulating the Study and Practice of Medicine" in this province, introduced by the Hon. Mr. Attorney-General Smith, has been postponed to the next session, having been referred to a Committee after its first reading. For many reasons, this is, perhaps little to be regretted, as it will enable the profession generally to become meanwhile more minutely acquainted with its details, and afford them time to express their sentiments upon it.

"To the profession generally, it must have been a source of no little gratification to have witnessed the fact of its having been made a ministerial measure: in this respect, imitative of the British and Norwegian governments at the present moment, both of which have submitted their measures, preparatory to the final decision of their Parliaments, to the consideration of the profession in the respective countries. This is as it should be. Those whose interests are directly affected by legislative enactments, of what nature soever these may be, have an undoubted right to be consulted, and to express their sentiments on the matter: and the deference which has been manifested in the two cases to which we have alluded, and in our own, is but a simple act of justice to a very large, influential, and intelligent body of practitioners."

PULMONARY CONSUMPTION *successfully treated with Naphtha, with cases from other Medical Men in support of that Treatment, and an Appendix, showing the Utility of Puncturing Tuberculous Cavities, as an adjuvant in the Cure of Phthisis. Second edition, revised and enlarged.* By JOHN HASTINGS, M.D., Physician to the Blenheim Street Dispensary. London: John Churchill, Princes Street, Soho. 8vo. pp. 260.

THE introduction of any new remedy is generally attended with some controversy and difference of opinion. In the present instance, the discussion has been carried on with a good deal of warmth. It is not our province to decide on the merits of this, which is a medical question, but we recommend those who are interested in the subject to read the *facts* as stated in the above work.

THE SALE OF SPIRIT OF WINE.

On Wednesday, May 7, Mr. John Farmer, Chemist, of High Street, Putney, appeared before Mr. Paynter (at Wandsworth) to answer an Excise information, charging him with having unlawfully retailed half a pint of spirit of wine. The information was laid by Mr. Pacey, supervisor of the Excise for the district, who had employed Matilda Bear, a girl of seventeen, lately his servant, to purchase the spirit. The witness deposed, that when she applied for it, Mr. Farmer's assistant stated that he could not sell it, having no licence, and enquired for what purpose she wanted it? She said she did not know; and the young man gave her the spirit, for which he charged 1*s.* 8*d.* Mr. Farmer's assistant was in Court, and was prepared to swear that he had told the witness he could not sell it, except for a lotion, or some other medicinal purpose, and that she said she believed it was wanted for a lotion; in which belief he had sold it. But the supervisor declared that this evidence was not to the purpose, as the Act of Parliament admitted of no exception. Consequently, the magistrate did not call Mr. Farmer's witness; but on the evidence of Matilda Bear, convicted him in the mitigated penalty of £12 16*s.* 6*d.* On cross-examination, Matilda Bear admitted that she could neither read nor write, and was not acquainted with the nature of an oath. Mr. Farmer also alleged in his defence, that he had good reason to believe the information to have been at the instigation of his late apprentice, whom he had convicted of robbery, and who had declared that "he would pay his master off by means of the Excise." The magistrate did not admit the validity of the defence, but allowed ten days respite, that Mr. Farmer might in the interim petition the Board of Excise.

A memorial having been drawn up, it was presented by Mr. Bell, at the Excise Office, to Mr. Wood, who promised to investigate the case.

The following reply was received from the office:—

"*Excise Office, 17th May*, 1845.

"Sir.—The Commissioners of Excise having had under their consideration your petition, dated the 12th inst., requesting that a mitigated fine of £12 16*s.* 6*d.* in which you have been convicted for selling spirit of wine without a licence, may be altogether remitted on the ground that the spirit was sold for a lotion, and that the witness for the prosecution (Matilda Bear) was ignorant of the nature of an oath, and could neither read nor write.

"I am directed to acquaint you that it was the province of the magistrate who heard the case, to judge whether the witness understood the nature and sanctity of an oath, and was in other respects competent. That he was satisfied upon these points, is proved by the fact that he admitted and adjudicated upon her evidence.

"The Board therefore see no reason to question the truth of her testimony, or to suspect that the detection was instigated by malice; on the contrary, they have grounds for believing that it was the practice at your shop to sell pure spirit of wine to any person, and that the suggestion in the present instance, that it was wanted as a lotion, is habitually made with the mere object of avoiding the consequences of a detection.

"I am also to remind you of the previous and express caution which you received upon the subject of the sale of this article; and I am further to observe, as a guide to the conduct of your business, that the mere infusion of a small quantity of camphor or other similar substance is not considered a *bonâ fide* medicated spirit, so as to protect a Chemist in selling it.

"The Board having however, in some other similar cases restricted the mitigated penalty to £10, they will be ready to accept the same amount

from you in satisfaction of the fine awarded by the magistrate, provided the sum be paid forthwith, I am, Sir, your most obedient servant,

J. Clayton Freeling."

In one respect this decision was considered unsatisfactory, and Mr. Farmer, at the suggestion of his professional adviser, again memorialized the Board on this point. The decision of the Board had been formed on the evidence adduced at the trial. But Mr. Farmer's witness was not heard, consequently the evidence (such as it was) was all on one side. The evidence of Mr. Farmer's assistant having been reduced to writing, and sworn beforea magistrate (Mr. Hardwick), was enclosed with the second memorial. The Board declined to go into the case a second time.

TO CORRESPONDENTS.

The Sale of Spirit of Wine.—Several correspondents have made inquiries on this subject; some suggest a further application to the Government for an alteration in the law; others are surprised that any persecution continues, after the statement in our last number. [We can only repeat, that it is useless to attempt to obtain an alteration in the law. This would extend the privilege sought for by Chemists to any person who might think proper to call himself a Chemist, which title might be assumed as a means of evading the law by persons desiring to establish dram-shops. If the Chemists were constituted a professional body by Act of Parliament, and individually under the control of their own governing board, they might safely be entrusted with powers, which under existing circumstances, could not be granted. We are persuaded, that it is the intention of the Board of Excise, to act fairly and with proper leniency towards Chemists, and we again caution our brethren, not to "sail too near the wind." Any evasion, subterfuge, or imprudence in not being prepared with evidence in case of need, should be guarded against: but by the observance of the rules laid down in our last number, page 496, there is no cause for apprehension. In the newspaper reports of Mr. Farmer's case, it was stated, by the Supervisor of the Excise, that an order from the Treasury was of no avail, unless sanctioned by a specific Act of Parliament. This is untrue. The authority of the Treasury could not be disputed by the Excise.]

"A Member" inquires what colour the following syrup should be:—℞ Ferri Iodidi ℈ij; Syrupi ℥ij. M. [If prepared by dissolving iodide of iron in simple syrup, it would be of a light brown colour; but if prepared, as recommended in the Pharmaceutical Journal, vol. i., page 522, it would be colourless. The latter is the proper method.]

"Carolus."—See vol. i., page 522.

"A Member." (Welshpool.)—We have frequently stated that Scheele's Hydrocyanic acid is assumed to contain 5 per cent. of real acid; that of the Pharmacopœia, 2 per cent.

"Morton."—Aqua lauro-ceraci is colourless, in the simple state. The Dublin College orders a small quantity of compound spirit of lavender to be added, to give it a colour.

S. G., being an Associate, may have access to the Library of the Society, when in London. See vol. i., page 178.

M. P. S. (Hogsthorpe.)—We have made diligent inquiry, and cannot ascertain where the "Perfumers' Oracle" is published.

"An Attentive Observer" (Plymouth).—(1.) There is no reason to expect a new Pharmacopœia very soon.—(2.) *Mr. Fownes's Manual of Chemistry*, and *First Lines*, by Dr. Steggall.—(3.) Selecta è Prescriptis.—(4.) We are not acquainted with the other two works named.

F.K.—We intend to continue the articles on veterinary medicines occasionally, one will be ready next month.

X.Y.Z. mixed sesquicarbonate of soda and tartaric acid, of each ℥iss, sugar ℥viij, and bottled it. The bottles burst, and he wishes to know how this may be prevented. [Dry the powders before mixing them.]

"Alpha."—(1.) See vol. ii., No. 8.—(2.) The London Pharmacopœia of 1650 has a formula for *Pilulæ Cochiæ majores*, and *Pilulæ Cochiæ minores*. The latter only of these, with a little modification, was retained in the Pharmacopœia of 1746, under the name of *Pilula ex Colocynthide cum Aloe*, of which the following is the formula:—Aloes Socot., Scammonii, āā ℥ij—Medullæ Colycinthidis ℥j—Olei caryophyllorum ℥ij—Syrupi Spinæ cervinæ q. s. ft. Massa.

"A Camden Town Associate."—It is contrary to the rules of the Pharmaceutical Society for members to visit patients and practise Midwifery.

"A Member" (Peterborough).—For the best methods of detecting arsenic, see vol. iii., pp. 123 and 180, and vol. iv., p. 133 of this Journal.

"Limitation."—(1.) *Dr. Thomson's Materia Medica*, 25*s*.—(2.) *Phillips's Translation of the Pharmacopœia*.—(3.) The subscription from an Associate is 10*s*. 6*d*., without any admission-fee.

A. W. encloses several labels, wishing to know whether the articles are liable to stamp duty. [Seidlitz and Soda powders do not require a stamp. The decoction of Sarsaparilla, being a Pharmacopœia preparation, does not require a stamp; and we imagine that the circumstance of its being merely concentrated does not make it liable. If described as a *secret* preparation, prepared by any new method, and recommended for particular complaints, with specific directions, it would be liable. Dr. Gregory's powder is so well known as a popular remedy that it cannot be considered a *secret* preparation, and, therefore, we think it is not liable to a stamp. Pectoral lozenges or any other nostrum, the composition of which is not known, if sold with printed directions and recommended for any disorder, require a stamp.]

N. G. (*Qu.?* No Go.) recommends a discontinuance of the use of aprons behind the counter, which he considers to be derogatory to the professional character of the Pharmaceutical Chemist.

"C. Radiax."—The subject is one which we cannot entertain.

C. R. V.—We are not acquainted with the business of a currier.

"Inquisitor."—It is not necessary for an Apprentice to pass the minor examination immediately at the close of his indentures; but he should do so as soon as possible afterwards.

N. R. I.—Depilatory, for removing stray hairs, is made with quick lime, orpiment, and starch. It is not a safe application unless very carefully used.

M. P. S. complains of the practice adopted by some travellers of wholesale houses of quoting the prices of drugs in the hearing of customers.

I. H. I. inquires whether Druggists who dilute and colour acetic acid and sell it as vinegar, are liable to the duty as vinegar manufacturers. [We think they would be liable to be prosecuted for fraud.]

"Tyro."—Solution of chlorine is made by passing chlorine through cold water, in a Wolf's apparatus. It should not be acid.

A. P. S. has sent us a prescription, which he lately received from a celebrated quack doctor in his neighbourhood. It is as follows:

"qarter nonce jolip
qarter nonce rubub
qarter nonce camamel
qarter nonce mustard to be made into 80 pills."

The writing is as good as the spelling.

We have received from Mr. WALKER some interesting statements respecting the injurious practice of burying the dead in populous neighbourhoods. The impropriety of this custom is so generally admitted, that we hope burial-grounds will soon be entirely removed from such districts. Much credit is due to Mr. WALKER for the exertions he has made to effect this reformation.

"DELTA, A. P. S."—There is sometimes a deposit in oxymel of squills, consisting of sugar in granular crystals, and arising, probably, from the conversion of uncrystallizable into crystallizable sugar. Changes of this kind occur under a variety of circumstances. A copper pan is often used for making oxymel of squills, and if perfectly clean, and the oxymel not allowed to cool in the pan, the copper will not be sensibly acted upon; but a tinned pan ought to be employed.

P. (1.) Says he has found the formula recommended by Dr. Christison for making pills of iodide of iron to answer very well, no decomposition of the iodide occurring, and he recommends the same method of preserving the iodide of iron for general use in dispensing.—(2.) In preparing liq. ammon. acet. any excess of acetic acid could not be advantageously driven off by boiling. Water is volatilized at a lower temperature than acetic acid, and, therefore, vinegar is rendered stronger rather than weaker by boiling.

"JOSEPHUS."—We know no formula for *Syrupas sulphatis ferri et quinæ*.

"AN ASSOCIATE" (Leicester).—For Infusum Chiraytæ, see vol i., pp. 268 and 413.

"OXYGEN."—BLUE INK: Take of best Prussian blue ℥ss, oxalic acid ℈ij, distilled water ℥xvj; mix and filter.

"JUVENTA."—(1.) The best method we can suggest for ascertaining whether Pil. Rhei. Comp. has been made with treacle or with syrup, is to treat a portion of it with water, to examine the solution with reference to its colour, taste, and smell, and then to ascertain whether crystals of sugar can be obtained, as treacle would yield none.—(2.) We recommend *Lindley's School Botany*.—(3.) Rose water ought not to be made with otto of roses, magnesia, and water, as described. The decomposition alluded to is occasioned by the magnesia, a portion of which is dissolved by the water.

"AN ENQUIRER."—The Edinburgh Pharmacopœia of 1817, contained a formula for *Unguentum Hydrargyri Nitratis Mitius*, which was as follows:—Take of mercury 1 part, nitric acid 2 parts, olive oil 27 parts, hog's lard 9 parts.—(2.) The citrate of iron and quinine may be dissolved in distilled water to the extent mentioned (℈j. to ℥iss. of water) if heat be employed. The above salt, however, as met with in commerce, is not always exactly the same, and it is subject to change with keeping, becoming less soluble in water.

J. C. B. (Leeds).—We are unable to state the quantity of oxalic acid or muriate of tin required to prevent fermentation in eight pounds of sugar. Dumas mentions that oxalic acid entirely prevents fermentation, but does not give the requisite proportions.

"INQUISITOR" wishes for a formula for ink, which is blue when first used, and afterwards becomes black.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to THE EDITOR, 338, Oxford Street, before the 20th of the month.

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ERRATA.

Page 154, last line, *for* LUKE, *read* MARK.

—— 557, line 11 from the bottom, *for* "zinc or positive," *read* "silver or negative."

line 10 from the bottom, *for* "silver or negative," *read* "zinc or positive."

line 5 from the bottom, *for* "chloride of oxide," *read* "chloride *or* oxide."

—— 558, line 12 from the top, *for* "fermented," *read* "permeated."